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19 **IN THE UNITED STATES DISTRICT COURT**
20 **FOR THE DISTRICT OF MONTANA**
21 **BILLINGS DIVISION**

22 UNITED STATES FIDELITY)
23 AND GUARANTY COMPANY,)
24) Nos. CV-04-29-BLG-RFC
25 Plaintiff,) CV-08-29-BLG-RFC
26 and)
27) **VOLUME 7**
28 THE CONTINENTAL INSURANCE) **TRANSCRIPT OF JURY TRIAL**
29 COMPANY,)
30 Plaintiff Intervenor,)
31 vs.)
32)
33 SOCO WEST, INC.,)
34 Defendant.)
35 _____)

36 **BEFORE THE HONORABLE RICHARD F. CEBULL**
37 **CHIEF UNITED STATES DISTRICT COURT JUDGE**
38 **FOR THE DISTRICT OF MONTANA**

39 James F. Battin United States Courthouse
40 316 North 26th Street
41 Billings, Montana 59101
42 Tuesday, March 16, 2010
43 08:29:44 to 17:20:37

44 Proceedings recorded by machine shorthand
45 Transcript produced by computer-assisted transcription

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graphics display:

MS. JULIANNE ROHM
MR. NEIL BAILEY

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PROCEEDINGS

(Open court.)

(Jury present.)

THE COURT: Please be seated.

Call your next witness.

MR. GROSSBART: Your Honor, the insurers call
Dr. Peter Shanahan.

WHEREUPON,

PETER SHANAHAN, Ph.D.,
called for examination by counsel for plaintiffs, after having
been first duly sworn to testify the truth, the whole truth,
and nothing but the truth, testified as follows:

DIRECT EXAMINATION

BY MR. GROSSBART:

Q Good morning, Dr. Shanahan.

A Good morning.

Q Now you have been retained by counsel for United States
Fidelity and Guaranty Company and the Continental Insurance
Company to give expert testimony here today?

A That's correct.

Q All right. Why don't you tell us a little bit about
yourself, and let's start out with where are you from?

A I am from Massachusetts. I live in the town of Acton,
Massachusetts and also have a business there.

Q Okay. Well, let's talk about what you do in Acton,

1 Massachusetts. Is that, by the way, is that near Boston?

2 A It is near Boston.

3 Q Tell us what you do for a living.

4 A I actually have two jobs. I teach at the Massachusetts
5 Institute of Technology, MIT, and I also have a consulting
6 business which I started in 1988, and I conduct my consulting
7 business from the town of Acton near my home.

8 Q And why don't you just briefly describe for us the types
9 of things you teach in the MIT portion of your livelihood.

10 A I teach several classes each year. The classes I teach
11 the most frequently are one in hazardous waste site
12 management; that's a graduate-level class. I also teach a
13 course in fate and transport of chemicals in the environment,
14 which is also a graduate-level course. I also teach a senior
15 project class, which is a class we have for our senior
16 undergraduates. And then I also do a project class with our
17 masters students, generally a field-based project course with
18 a handful of graduate students.

19 Q And how long have you been teaching at MIT?

20 A I've been teaching at MIT since 1996.

21 Q Okay. And you said you had a consulting business. Tell
22 us the name of that business and what it does.

23 A The name of the business is HydroAnalysis, Incorporated,
24 and I offer specialty services in hydrology and environmental
25 engineering.

1 Q Can you tell us what hydrology is?

2 A Well, I guess a short description is hydrology is the
3 science of water in the environment.

4 Q Okay. And this is a case about water in the environment,
5 at least among other things; that's a fair statement?

6 A That's correct.

7 Q Okay. Thank you.

8 Tell us about your educational background, where you went
9 to college and the degrees you've received, please.

10 A I have four academic degrees. I have two bachelor of
11 science degrees. One is in civil engineering in which I
12 concentrated in water resources, and the other is in earth and
13 planetary sciences. Both of those are from MIT. I have a
14 master of science in environmental earth sciences from
15 Stanford University, and I also have a Ph.D. in environmental
16 engineering from MIT.

17 Q When did you get your Ph.D.?

18 A I received my Ph.D. in 1981. I think the degree is
19 actually '82. I finished my work in '81.

20 Q All right. The early '80s?

21 A Yes.

22 Q When did you start HydroAnalysis?

23 A In 1988.

24 Q So that company has been around for just over 20 years,
25 22 years?

1 A Twenty-two years, yes.

2 Q Did you work at any consulting areas before starting
3 HydroAnalysis?

4 A Yes. Prior to that -- I'd actually worked between my
5 masters degree and my Ph.D. I worked for four years. Went
6 back to school.

7 And then, after finishing school, I went to work for a
8 company; at the time it was called ERT, Incorporated. It has
9 since changed its name to ENSR, E-N-S-R, all capital letters,
10 and again it's changed name to AECOM, which is, again, all
11 capital letters, A-E-C-O-M.

12 Q Did they do work similar to what you do now with
13 HydroAnalysis?

14 A Yes. They were a full-service environmental firm, but my
15 particular work was the same kind of work I'm now doing with
16 HydroAnalysis.

17 Q All right. Can you describe generally your experience in
18 dealing with, whether it's teaching or consulting or some
19 combination of both, can you just describe for us generally
20 your experience dealing with issues regarding the study of
21 groundwater pollution?

22 A Yes. I actually do two types of work in my business. I
23 do work in water supply, particularly groundwater protection.
24 I've done a number of studies in the State of Massachusetts
25 for municipalities to define where the groundwater coming from

1 public water supplies comes from so that those areas can be
2 protected. And then I also have done a good bit of work in
3 hazardous waste site investigation. I've worked on about 50
4 federal Superfund sites, a slightly larger number of state
5 Superfund sites, another group of manufacturing sites which
6 are under the Resource Conservation Recovery Act, so a good
7 variety of hazardous waste sites.

8 Q Does any of that work involve trying to figure out how
9 groundwater became contaminated?

10 A Yes.

11 Q Does all of it involve that? Can you speak to that a
12 little bit?

13 A Yes. In fact, I guess I would say my specialty is
14 working with data, taking the various kinds of hydrogeologic
15 and hydrologic and water quality data and understanding how a
16 site works; what happened, what the various phenomena are that
17 create the situation that's seen in the data.

18 Q Okay. Have you had experience over these many years, in
19 looking at groundwater, have you had experience with
20 situations where the contamination involved chlorinated
21 solvents?

22 A Yes. I've worked on a large number of chlorinated
23 solvent sites. The majority of the sites I've worked on have
24 been chlorinated solvent sites. For example, one site that I
25 worked on quite extensively is the Woburn Wells G and H site,

1 which is two public water supply wells that were contaminated
2 by perchloroethylene and trichloroethylene, and I was the --
3 worked on the investigation phases of that and then also was
4 the manager of the groundwater remediation for that site.

5 Q Now you mentioned perchloroethylene, I believe, in your
6 last answer. That's perc, right?

7 A That's perc, yes.

8 Q And for short, we'll just call it perc today.

9 A Yes.

10 Q All right. And that's a chlorinated solvent?

11 A It is, yes.

12 Q What are the three or four main chlorinated solvents that
13 we may hear about in your testimony today?

14 A We'll hear about perc, which is also called
15 perchloroethylene or tetrachloroethylene. It's a chemical
16 that has four chlorine atoms on it. We'll also hear about
17 trichloroethylene, which is a similar chemical but has only
18 three chlorines. And we'll hear about cis-1,2
19 dichloroethylene, which, again, is a similar compound; only
20 two chlorines on that molecule.

21 Q All right. But they're all within the family of
22 chlorinated solvents?

23 A They are.

24 Q Okay. In your consulting work, can you describe, in
25 overview fashion, the types of different clients you've had

1 who have come to you for work, companies of what sort,
2 *et cetera*? Just talk to that, please.

3 A All right. I have a large variety of clients. I've done
4 work for state governments, municipalities, private citizens,
5 citizen groups, watershed associations, the United Nations,
6 the World Bank, a little bit of federal government work, as
7 well as industrial companies, and, of course, insurance
8 companies, or at least counsel for insurance companies.

9 Q All right. And some of that work has -- has some of that
10 work led to you having to give testimony, whether in
11 depositions or courtrooms?

12 A Yes, it has.

13 Q Can you -- have you testified in chlorinated solvent
14 cases before, either depositions or courtrooms, that you
15 recall?

16 A Yes, I have.

17 Q Okay. Are you a member or affiliated with any
18 professional organizations or associations?

19 A Yes. I'm active in a number of professional
20 associations. I'm a fellow of the American Society of Civil
21 Engineers and have been on technical committees of the
22 society. I'm a member of the groundwater -- the Association
23 of Groundwater Scientists and Engineers, and I've been on the
24 editorial board of the Journal of Groundwater. I'm also a
25 member of the American Geophysical Union, the International

1 Water Association, and a number of other professional
2 associations.

3 Q Have you written on the topics within your area of
4 expertise?

5 A Yes. I've written about 50 journal articles, book
6 chapters, and other technical publications.

7 Q Okay. And you're not here for free. I assume you're
8 being paid, right?

9 A I am being paid. I'm being paid \$300 an hour for my time
10 here and in preparation to be here.

11 Q Okay. Why don't we start generally with what you were
12 asked to do in this particular case. Can you describe for us
13 what you were asked to look at and consider, please?

14 A Well, I was asked to look at the contamination at the
15 Dyce facility and, in particular, to evaluate what might be
16 the cause of the contamination in the northwest corner of the
17 site, and also to evaluate the hypothesis put forward that
18 there was a one-time spill in the 1975 to '77 time range and
19 that that was the cause of the contamination seen in the
20 northwest corner of the site.

21 Q And we'll obviously spend a lot of time talking about
22 this, but why don't you just start with telling us whether or
23 not you have formed opinions with regard to what you were
24 asked to do and what those opinions are, please.

25 A Yes. I've formed three opinions, which I put into my --

1 put into an expert report.

2 The first opinion is that the site is -- there's
3 widespread contamination at the site. The operation area is
4 highly contaminated, as well as the northwest corner.

5 The second opinion is that the most likely explanation
6 for the contamination in the northwest corner is the steady
7 discharge of wastewater, which included perchloroethylene,
8 from the catch pond, and that that was done over a good number
9 of years and that that accumulation is what we see in the
10 northwest corner.

11 And then, finally, I do not believe that the data support
12 the theory that there was a one-time release that caused the
13 contamination in the northwest corner.

14 Q All right. Can you describe for the jury the types of
15 things you've looked at and reviewed and studied that bear on
16 the opinions you're going to expound upon later in your
17 testimony? What did you look at?

18 A Well, there's a large number of reports and a good
19 quantity of data at this site. I focused on the technical
20 data. I looked at the past consultant reports, either done
21 for the government agencies or done for Soco and its
22 predecessors. I've looked at the data behind those reports,
23 and so that includes the laboratory analyses, the various
24 water quality analyses that were done in the laboratory, the
25 well logs in which the folks out in the field recorded what

1 they found when they drilled wells, field notes that are a
2 part of those reports.

3 I also -- actually some of those reports really weren't
4 of very good quality. I couldn't really see the maps too
5 clearly and all that, so I actually arranged to make a visit
6 to the MDEQ, the Montana Department of Environmental Quality,
7 and obtain better quality documents, and I actually obtained
8 some additional documents that had not been exchanged by the
9 parties in this case. I also obtained a copy of their
10 computer database with all of the various laboratory analyses
11 and results that were recorded there.

12 I also looked at a good number of aerial photographs. I
13 obtained aerial photographs from the web and different
14 sources, as well as I was provided some aerial photographs.

15 I'm trying to think what else.

16 Q That's okay. Just what you remember. Is that a pretty
17 good overview?

18 A (No response.)

19 Q Did you -- oh, I'll ask you one. Did you look at Dyce's
20 sworn statements to the EPA in connection with their
21 investigation?

22 A Yes, I did have that, and I had, I had a little bit of
23 historical information. I had Dyce's sworn statements. I had
24 the Versar report, which was a relatively early report that
25 reported on characteristics of the site and the business that

1 went on at the site.

2 Q Now is the Dyce facility part of a larger Superfund site?

3 A It is. It's part of the Lockwood solvent Superfund site.

4 Q Can you describe -- that's a shorthand expression for
5 something. What does it mean to be a Superfund site?

6 A A Superfund site is a site that has been officially
7 listed under the federal Superfund Act. They have something
8 that they call the national priorities list, which is, in
9 essence, a list of the worst hazardous waste sites in the
10 country that need to be cleaned up.

11 Q Okay. And is that a -- is a Superfund site -- well, let
12 me ask it this way. Is the Superfund site then here under the
13 jurisdiction of at least, among others, the Environmental
14 Protection Agency?

15 A Yes. It's under the -- it's actually shared
16 jurisdiction, at least on this site. The Environmental
17 Protection Agency and Montana DEQ are both involved in the
18 Superfund site.

19 Q Now as a result of being a Superfund site, does that put
20 into place a certain series of reports and investigations that
21 have been carried out by governmental agencies?

22 A Yes. There's actually a very tightly defined set of
23 procedures, and there's extensive regulations that govern
24 Superfund sites. In particular, there is a step called the
25 remedial investigation. We've heard a lot of references to

1 the RR report. The conduct of a remedial investigation is
2 actually something that's required by the regulations. The
3 remedial investigation develops the data necessary to figure
4 out how to clean up a site.

5 The remedial investigation is generally followed by the
6 feasibility study, and the feasibility study is an
7 investigation or engineering study in which one evaluates
8 various alternatives to clean up a site, and so it will
9 basically be a laundry list of potential technologies and
10 whether those apply to the site and then finally a short list
11 of technologies or cleanup plans that would work at the site.

12 Those are generally done by engineering contractors, both
13 the RI and the FS, and then that information is evaluated by
14 the government agencies, and the agency, the agency in charge
15 will issue a record of decision in which they pick a
16 particular set of cleanup actions from the feasibility study
17 and say this is the one set that we will actually go through
18 with at the site.

19 Q Now do all those types of reports exist in this matter,
20 this Superfund site?

21 A Yes, they do. And, in fact, the RI was done in two
22 stages. There's an original RI report, and then they went out
23 and did sort of an additional study, and that's reported in
24 the RI addendum report.

25 Q I take it these are -- well, are these long,

1 comprehensive reports, as a general proposition?

2 A Yes. In fact, I don't think I've seen a paper copy of
3 the RI report. I understand it comes to 18,000 pages and so
4 no one has actually -- well, I shouldn't say no one. I
5 imagine there are some printed copies, but I haven't seen a
6 printed copy.

7 Q Now as part of your work in forming your opinions, did
8 you look at all of the depositions and prior sworn testimony
9 of various Dyce employees and others that were taken in
10 various matters leading up to where we are today?

11 A I have read some depositions, although actually I did not
12 read the depositions until after I finished my expert report,
13 at least the first part of my expert report, in which I stated
14 my opinions. I really based my conclusions upon the technical
15 data that was available. I subsequently have read some
16 depositions and heard testimony in the court, but my opinions
17 were not based on that material.

18 Q All right. And did you later get an opportunity to
19 actually go visit the Dyce site?

20 A Yes. I have visited the site.

21 Q Do you recall when that was?

22 A I think it was in the summer, but to be honest, I can't
23 recall the date.

24 Q Okay. In any event, the opinions that you did originally
25 in this case and have described for us remain your opinions

1 today; is that right?

2 A That's correct.

3 Q There's nothing you've seen since you've done your
4 original opinions that has changed your views as to the
5 conclusions you've laid out for us so far this morning,
6 correct?

7 A No, nothing has changed.

8 Q Let's talk a little bit about what is a groundwater
9 contamination investigation, and, in particular, focusing on
10 what happened here.

11 How do people such as yourself, experts such as yourself,
12 figure out what's in the groundwater? What do they do? Can
13 you generally talk to that?

14 A Yes. There's a certain difficulty in doing a groundwater
15 investigation because it's underground. You can't just walk
16 up to the groundwater and sample it. You have to do
17 subsurface investigation, and so the primary tool is a -- some
18 sort of groundwater monitoring well or soil boring, and so
19 generally there's a lot of drilling involved. There are a lot
20 of punching holes into the ground.

21 The typical procedure would be to drill wells, take soil
22 samples as you drill a well, do some field screening as you go
23 through that process, and there are field devices, which, the
24 shorthand for them are sniffers. They're basically vapor
25 detectors that one can use to screen soil samples and see if

1 there's contamination in there, and that will often help
2 dictate which samples get sent to the laboratory for analysis.

3 Sometimes the borings are not completed as wells, but
4 often this boring -- which is, you know, just basically a hole
5 in the ground. It's like putting down a wood bit, a drill bit
6 as you would use in wood, and those are often completed as
7 monitoring wells. So pipe is put down, and it's open to a
8 certain interval, depth interval in the aquifer, and
9 groundwater samples can be extracted from that as well.

10 That's sort of the deluxe sampling technique. There is
11 also simpler sampling techniques in which one just, in
12 essence, uses a hydraulic device and pushes a pipe down into
13 the ground and can do either measurements or take a one-time
14 sample of soil or groundwater. That's a less expensive
15 technique, and those are sealed back up generally and not used
16 as a permanent monitoring well.

17 Q So all sampling doesn't involve samples going to a
18 laboratory; is that what you're telling us?

19 A That's correct. A subset of the samples goes to the
20 laboratory, and generally what goes to the laboratory is
21 decided in the field based on these field screening devices,
22 the sniffers that I mentioned.

23 Q And how are -- can you just describe generally how
24 laboratory samples are gathered and just how that process
25 works?

1 A Well, there are very formal procedures for this. There's
2 a lot of quality assurance and other techniques that are
3 involved to make sure that your samples are representative and
4 that they're properly analyzed, but it's a process of
5 collecting soil with properly cleaned instruments and devices
6 and putting those in bottles and sending them to a laboratory,
7 usually shipped overnight, and then the laboratory does an
8 analysis using sophisticated chemical analysis equipment.

9 Q Are some sampling techniques considered more reliable or
10 precise than others?

11 A Well, in general, the laboratory techniques would be
12 considered the most reliable. There are field sampling
13 techniques and these field screening techniques, and those
14 would be a little bit less -- not quite the same high quality
15 as the laboratory analysis. The laboratory analysis would be
16 typically considered the best.

17 Q Okay. Now you've mentioned perchloroethylene or perc.
18 Let's talk a little bit about the nature of perc, its general,
19 commonly understood properties. The floor is yours. What's
20 perc?

21 A Well, probably everyone is familiar with the smell of
22 perc. It's the "what you smell" in a drycleaner. It's a
23 chlorinated solvent, and it has a few properties which are
24 important as far as its behavior as an environmental
25 contaminant. One is that it is a good deal heavier than

1 water, and so it will sink in an open water body. It will
2 also sink, you know, due to gravity in the subsurface. It's
3 also runnier than water. It has a lower viscosity than water,
4 so it will actually travel somewhat more freely in the
5 subsurface than water will. It's also a volatile compound.

6 Q Well, let me stop you there. When you say "volatile,"
7 what do you -- you don't mean it explodes, do you?

8 A No. It means that it tends to evaporate, so it's -- it
9 evaporates quickly and very readily.

10 Q Okay. Does it mix well with water?

11 A No. It is sparingly soluble. We've -- you've heard in
12 the courtroom a lot of discussion of a part per billion as a
13 measure of concentration, and that's a measure of the amount
14 of perc that has dissolved in water. It's usually reported in
15 parts per billion.

16 A part per billion is an exceedingly small concentration.
17 It's the equivalent of one drop in a 25,000-gallon railroad
18 tank car. If you thought about it as, say, as an analogy with
19 time, it's one second in 32 years, is a part per billion.

20 Q Does that mean there's a billion seconds in 32 years?

21 A Yes, yes. So it's a very, very small concentration, and
22 perc is -- you know, perc dissolves in water at these low
23 concentrations, but it's really sparingly soluble. It really
24 doesn't mix with water.

25 Q Thank you.

1 We've heard a phrase "DNAPL," D-N-A-P-L. Is that an
2 acronym for something? And answer that, please, and tell us
3 what DNAPL is.

4 A It is an acronym. It stands for "dense nonaqueous phase
5 liquid." A nonaqueous phase would be a liquid that exists as
6 something separate from the water. And "dense," obviously,
7 it's denser than water.

8 Q Is that another way of saying heavier?

9 A Yes. Kind of the shorthand is it's a sinker as opposed
10 to a floater.

11 Q All right. Now we've heard references to BTEX. Is that
12 an acronym? And, if so, what is it and tell us what that
13 means.

14 A BTEX is an acronym for benzene, toluene, ethylbenzene,
15 and xylene, a family of related compounds that are associated
16 with petroleum, and those are floaters. Those are lighter
17 than water, so they're kind of the opposite of perc as far as
18 its density behavior.

19 Q Are they volatile, also?

20 A They are also volatile. They tend to evaporate quickly.

21 Q How about -- you mentioned, you talked about solubility
22 of perc. How about the BTEX compounds? Do they mix well with
23 water?

24 A No. They are also sparingly soluble, and that's why they
25 form an LNAPL, a light nonaqueous phase liquid. They

1 basically remain as a separate phase, a separate liquid.

2 Q Let me see if this would help illustrate things. If I
3 had a pitcher of water in one hand and a container with perc
4 in the other hand and I poured the perc into the water
5 pitcher, what would happen to it?

6 A Well, what you would see is they're both clear liquid, so
7 you would see these two clear liquids, but you'd see an
8 interface between them. So the perc would settle to the
9 bottom, and you would see, you know, a separate phase there,
10 and then the water would be on top of that.

11 Q What if I then stirred it, left the room, and came back
12 in an hour? What would I see? Would I see something
13 different or the same thing?

14 A Well, it would be kind of like oil and vinegar, a
15 dressing. I mean, they would separate back out, and you would
16 see the two layers forming again.

17 Q Okay. What if I took that same pitcher of water now with
18 perc at the bottom and took another container, same amount of
19 the perc as before but, this time, one of the BTEX chemicals
20 and poured it into the same pitcher of now water on top, perc
21 on the bottom? What would, what would happen?

22 A Well, you'd wind up with three layers. You'd have perc
23 at the bottom, water in the middle, and then, say, xylene
24 floating on the top, because it's lighter than water.

25 Q So of the three layers, the layer exposed to the air is,

1 in that case, the xylene, the BTEX?

2 A The xylene would be on top and would be exposed to the
3 air, and, as I've mentioned, it's volatile. It wants to
4 evaporate and so that would tend to be -- tend to evaporate
5 off from the surface.

6 Q So what's going to evaporate first from our pitcher of
7 water in that situation -- or I should say our pitcher of
8 BTEX, water, and perc? What's going to evaporate out of there
9 first if it was left alone for some time?

10 A Well, the BTEX on the top, the floating on the top would
11 evaporate first. Then the water; after all of the BTEX was
12 evaporated off, then the water would be exposed, and that
13 would start to evaporate. And then, finally when the water
14 was gone, the perc would start to evaporate.

15 Q All right. Neil, could you please -- I want to go to
16 your first opinion. Your first opinion was that there's
17 widespread contamination; is that right?

18 A That's right.

19 Q All right. Let's delve into that a little bit for a
20 while.

21 Neil, would you please put up 3059, page 119, please?

22 Now, Neil, would you just focus on the lower right-hand corner
23 where the document is described?

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 MR. GROSSBART: All right. And I'll flash back,

1 but -- now flash back to the full picture.

2 DOCUMENT TECHNICIAN: (Complied with request.)

3 BY MR. GROSSBART:

4 Q Why don't you tell us what we're looking at here. What
5 is this diagram, and where is it from?

6 A Actually it might be helpful just to zoom in on this just
7 quickly, and we can see the legend on the figure as well.

8 DOCUMENT TECHNICIAN: (Complied with request.)

9 BY MR. GROSSBART:

10 Q Okay. However you want it. You just tell Neil how you
11 want to set it up, and tell us what the document is and what
12 it shows us.

13 A Well, particularly you can see that bottom box in the
14 legend says, "Target Area for Groundwater Remediation,
15 Concentration of," and it lists a number of chlorinated
16 solvents, "exceeds MCL," the maximum contaminant level. So
17 these are compound -- those yellow shaded areas are areas in
18 the Superfund site where the concentration of groundwater is
19 too high for the water to be drunk safely.

20 MR. GROSSBART: All right. Let me ask you, Neil,
21 would you just go to the diagram itself?

22 DOCUMENT TECHNICIAN: (Complied with request.)

23 BY MR. GROSSBART:

24 Q And -- okay. And that's a plume, right? That's a
25 picture of a plume, right?

1 A Well, actually two plumes.

2 Q Okay. This is -- is this the whole Superfund site? What
3 are we --

4 A Yeah. The area with the line that goes around here,
5 that's the entirety of the Superfund site.

6 Q Okay. And this case is about which plume? The top one?

7 A Yes. We've been looking at this plume. I don't actually
8 think that the entirety of the plume has been shown in an
9 exhibit, but it extends from the Dyce facility, the Dyce site,
10 all the way down to the river. You can see there's a large
11 area in which groundwater has been contaminated.

12 Q All right. And that's the Yellowstone River; is that
13 right?

14 A That's right.

15 MR. GROSSBART: All right. And, Neil, focus in on
16 that area, generally speaking, please.

17 DOCUMENT TECHNICIAN: (Complied with request.)

18 BY MR. GROSSBART:

19 Q All right. And with respect to this plume, can you just
20 maybe put a little mark about where it starts and tell us what
21 that starting point is?

22 A Well, the starting point, you can actually see that
23 building that's there. I just circled it, and I'll take the
24 mark off. That's the large warehouse at the Dyce facility, so
25 the plume starts at the Dyce facility.

1 Q All right. And it extends all the way to the Yellowstone
2 River?

3 A That's correct.

4 MR. GROSSBART: All right. Neil, pull up 3059,
5 page 121, which is two pages later.

6 DOCUMENT TECHNICIAN: (Complied with request.)

7 BY MR. GROSSBART:

8 Q And is this -- so is this a closeup of that beginning
9 section of the plume that we saw on the prior page?

10 A That's right. This is the start of the plume.

11 Q And you circled the large warehouse on the prior diagram.
12 Why don't you just put a, just put a check mark, or I think if
13 you just poke the screen --

14 A (Complied with request.)

15 Q Okay. And if this were spread out in this direction,
16 we'd eventually hit the Yellowstone River; is that right?

17 A That's right.

18 Q All right. The data you looked at is focused on this
19 area on this particular diagram; is that right?

20 A That's right. I've been looking at the area near the
21 Dyce facility.

22 Q All right. And there has been a lot of testing?

23 A (No response.)

24 Q Well, let me ask you in a nonleading way. Has there been
25 a lot of testing in the Dyce site property and surrounding

1 area?

2 A This is a fairly intensively sampled site. There is a
3 good bit of data that's been collected at this site. There's
4 some areas obviously more intensively sampled than others.

5 MR. GROSSBART: All right. Neil, would you please
6 put up Exhibit 5064?

7 And, Your Honor -- well, let me just ask you first.

8 DOCUMENT TECHNICIAN: (Complied with request.)

9 BY MR. GROSSBART:

10 Q Dr. Shanahan, you recognize this. Is this one of the
11 aerial photos that you reviewed in doing your work?

12 A Yes. This is the 1983 aerial photo that I looked at.

13 Q All right. And you looked at it obviously without the
14 yellow dots on it, at least initially; is that right?

15 A That's right.

16 MR. GROSSBART: All right. Your Honor, I'd like to
17 publish a stipulation of the parties as follows. This is
18 Exhibit 5064, and I'm going to read part of the stipulation of
19 the parties:

20 The location of the sampling points superimposed
21 over historical area photographs depicted on Exhibits 5060,
22 5061, 5062, 5063, and 5064 are accurate to a reasonable degree
23 of professional certainty.

24 That's -- the parties have agreed to that.

25 THE COURT: Thank you.

1 BY MR. GROSSBART:

2 Q All right. Now this doesn't literally -- well, this --
3 is every single sampling location done in this area reflected
4 on this particular exhibit?

5 A Well, the vast majority of the data are on this exhibit.
6 Not every single one, but the vast majority.

7 Q Okay. And if you looked, is this -- does this -- have
8 you looked at the data associated with these sampling
9 locations?

10 A Well, not each and every single one, but certainly the
11 majority of them, I have.

12 Q Well, have you looked at them sufficiently in order to
13 tell us whether or not there is contamination or not at
14 various data points?

15 A Yes, I have. I actually have evaluated the data for all
16 of these.

17 MR. GROSSBART: Okay. And, Neil, would you put up
18 Demonstrative 490, please?

19 DOCUMENT TECHNICIAN: (Complied with request.)

20 BY MR. GROSSBART:

21 Q What is this demonstrative showing us?

22 A This is based on our analysis of the data. It's largely
23 drawn from the database that Montana DEQ put together. We
24 actually put it into our own spreadsheet so it would be easier
25 to work with, and we tallied every well at which there was a

1 detection of a chlorinated solvent and also the MP borings
2 which are -- which were a set of field analyses done, any of
3 those at which there was an off-scale reading on their
4 detector.

5 Q Okay.

6 A So between those, basically between soil, groundwater,
7 and then the membrane interface probe data, this is all of the
8 places where you have what we would call hits; in other words,
9 detected chlorinated solvents.

10 Q All right. This doesn't refer us to concentrations or
11 anything more detailed like that? It's just up or down,
12 there's a hit? Is that what you're showing here?

13 A Yes. It includes all of the hits, even low-level hits.
14 They obviously vary.

15 Q Is this a pattern you would expect to see with a company
16 that was supposedly well run except for, I guess, one bad day
17 in 1975, '76, or '77?

18 A No. This shows a pattern of contamination. In
19 particular, if you go to the operational area, back where you
20 see the buildings and the tanks, there's contamination there,
21 so this is a -- there's a pattern here of chemicals having
22 been released to the environment basically throughout the
23 site. It's a dirty site.

24 MR. GROSSBART: Okay. Neil, would you put back on,
25 please, 3059, page 121? That's the --

1 DOCUMENT TECHNICIAN: (Complied with request.)

2 MR. GROSSBART: Okay. And, Neil, would you focus on
3 the operational area?

4 DOCUMENT TECHNICIAN: (Complied with request.)

5 BY MR. GROSSBART:

6 Q There are two green areas here, Dr. Shanahan, and those
7 have been classified by the EPA as what?

8 A The EPA has defined those as source areas.

9 Q And what does that mean?

10 A Well, those are basically the areas from which the EPA
11 has determined that the chlorinated solvents, which you see in
12 that groundwater plume, those are areas that are sources of
13 those chlorinated solvents. The chlorinated solvents are
14 coming from those areas.

15 MR. GROSSBART: Now, Neil, would you put up
16 Demonstrative 494, page 6, please?

17 DOCUMENT TECHNICIAN: (Complied with request.)

18 BY MR. GROSSBART:

19 Q This is a photo dated May 1, 2004, which, without the
20 markings, I believe is in evidence as another document. Do
21 you have that in front of you on the telestrator?

22 A Yes, I do.

23 Q All right. And the four areas on the ROD figure that we
24 saw are indicated where we've sort of done a combination green
25 and black dotted line, just to point them out. Is that right?

1 A That's right. Those are the same areas as in the figure
2 we just looked at from the ROD.

3 Q And there are also some, a smaller number of well plots
4 that this demonstrative focuses on? Individual well-sampling
5 locations. Do you see those?

6 A Yes. The yellow dots show some of the sampling locations
7 on the site.

8 Q Okay. I want to talk about a few of those just and have
9 you expand on what they show.

10 Moving from sort of bottom to top, in this area, there's
11 a reference -- Neil, why don't you just zoom in on that part.
12 Get me in here, please, Neil.

13 DOCUMENT TECHNICIAN: (Complied with request.)

14 BY MR. GROSSBART:

15 Q Okay. Let's talk about BHM. Just can you describe
16 generally, from the data -- and if you have some, the data in
17 front of you related to this -- what's BHM? What was found
18 there? Is it significant? Tell us how. Expand on that, if
19 you would, please.

20 A Well, BHM is in that, in the source area that's at the
21 lower right part of the diagram here as it's blown up. That
22 was a well that was installed by Maxim, a contractor that was
23 hired by Soco; I'm not sure if in those days it was Dyce or
24 Brenntag, but one of the predecessors to Soco.

25 Q Well, let me ask you this. What kind of sampling tool

1 was used at BHM, and what was found?

2 A You know, to be honest, I'm not a hundred percent sure if
3 it was -- actually I do see it. It was a direct-push sample.
4 So this is one of those samples where you put a pipe down; in
5 essence, put in a temporary well with a direct-push device, a
6 hydraulic push that pushes a pipe down into the ground, a very
7 sophisticated pipe, and samples were taken at BHM.

8 MR. LYNCH: Your Honor, could we get a reference to
9 the document the witness is looking at?

10 MR. GROSSBART: Yes, you can.

11 BY MR. GROSSBART:

12 Q And I see you're looking at documents. There's a lot of
13 data in this case. Did you bring some of the excerpts from
14 the data up there with you in order to -- you didn't memorize
15 every sample, did you?

16 A No, I didn't, and I'm looking for the actual data for
17 this particular, for this particular well, because I don't
18 remember it off the top of my head.

19 MR. LYNCH: Do you have a copy for us, Counsel, of
20 what he's looking at?

21 MR. GROSSBART: I beg your pardon?

22 MR. LYNCH: Do you have a copy for us?

23 THE COURT: Can you refer to a Bates stamp or page
24 number? Is this from the ROD?

25 MR. GROSSBART: This is from the evidence. This is

1 a report. I believe this is from Exhibit 3049, page 66. Do
2 you have that?

3 BY MR. GROSSBART:

4 Q Is that what you're looking for, Dr. Shanahan?

5 A You know, what I have is the -- I couldn't tell you the
6 exhibit off the top of my head, but the Maxim report has some
7 detailed maps in which they show the analytical results for
8 the different wells on the map, and it's in the Maxim report,
9 and I just have a photocopied excerpt of that so I can
10 remember the numbers.

11 Q Would you like to see the Maxim report, then? Could you
12 find it?

13 A Oh, yes. I could, I could find it. However, this is one
14 of the reports, which, the original report wasn't a very good
15 quality, and I had to get a better quality copy from MDEQ. So
16 I can show you the -- I can show it to you in the official
17 document, but I'm not sure it would be very clear.

18 Q Well, I just need it to help, if it would refresh your
19 recollection as to what's there, so you can tell us what's
20 there. Would you like me to bring you a copy of the Maxim
21 report?

22 A Well, I have the excerpt from it, so --

23 Q All right. Then what -- tell us what you're looking at.
24 The Maxim report is Exhibit 3049?

25 A Yes, and this is a figure from that report in which --

1 Q Tell us, tell us the page.

2 A I don't have the page. I just have -- it's a large
3 oversized figure, and I just have an excerpt from that page
4 with the results on it.

5 Q All right. Is it one of the figures attached to the
6 report?

7 A Yes, it's one of the several figures from the back of the
8 report.

9 MR. GROSSBART: Your Honor, may I approach?

10 THE COURT: Do you want to put it on this DOAR?

11 MR. GROSSBART: Well, I've got to figure out what
12 page it is. I thought we had the page.

13 May I just approach the witness for a second?

14 THE COURT: Yes.

15 THE WITNESS: One of these. I think it's Figure 2
16 or 3, possibly, from the Maxim report.

17 MR. GROSSBART: Neil -- I'm sorry, Your Honor. This
18 will just take a second.

19 (Discussion off the record at counsel table.)

20 MR. GROSSBART: Exhibit 3049, page 24, please.

21 DOCUMENT TECHNICIAN: (Complied with request.)

22 MR. GROSSBART: Why don't you enlarge the data,
23 please. And, Neil, push the page up, please. No, the other
24 direction. Enlarge on this, please.

25 DOCUMENT TECHNICIAN: (Complied with request.)

1 BY MR. GROSSBART:

2 Q Did I get it right? Is that what you were looking at?

3 A It's that, and these are the data for the chlorinated
4 solvents, and then there is also another figure. Probably the
5 next figure in the report has the data for the BTEX compounds.

6 Q All right. Well, let's talk about the chlorinated
7 solvents. What was found at BHM? Can you decipher this for
8 us?

9 A Yes. As you can see here, they took three samples of
10 groundwater at different elevations below ground surface, and
11 so you see 11 feet BGS for below ground surface, 20 feet and
12 26 feet. And the concentration of the chlorinated solvents,
13 particularly in the shallow, the 14-foot sample, are quite
14 high. The DCE is 86,000. The TCE is 8,800. The PCE is 580.
15 Vinyl chloride is 240.

16 Q Let me -- rather than read them, is this a significant
17 finding of chlorinated solvents or not?

18 A It is, yes.

19 Q All right. Why don't you put up -- you said there was
20 another page that talked about the BTEX?

21 A I think probably the next figure has the BTEX.

22 Q Let me show you 3049, page 25.

23 And give us that, please, Neil.

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 ///

1 BY MR. GROSSBART:

2 Q And was there a lot of BTEX found there?

3 A Yes. In particular, you can see that the toluene was
4 very high -- 210,000, again, at that 11-foot,
5 below-ground-surface reading.

6 So if you sum up all of these volatile organic compounds,
7 according to my calculations, this is the most contaminated
8 well, in total chemicals, at the site.

9 MR. GROSSBART: All right. Let's go back to 4094-6,
10 and specifically --

11 DOCUMENT TECHNICIAN: (Complied with request.)

12 MR. GROSSBART: Thank you.

13 BY MR. GROSSBART:

14 Q MP-105, why don't you just describe generally -- do you
15 have that? Do you see that in front of you?

16 A I do.

17 Q Just describe generally what the EPA reports found at
18 MP-105, and generally describe the findings.

19 A This was one of the membrane interface probe analyses.
20 What they found is high concentra- -- well, a high hit of, on
21 the detector at the very bottom of the boring, basically on
22 the bedrock surface, and they took a sample that was a
23 groundwater sample that was sent into a laboratory, and they
24 found 2,960 parts per billion of PCE in that sample as well as
25 other compounds at lower levels.

1 Q All right.

2 MR. LYNCH: Your Honor, again, the witness is
3 reading from a document. Can we have a reference?

4 MR. GROSSBART: I don't know that he is reading from
5 a document. I think he's organizing his mix.

6 BY MR. GROSSBART:

7 Q But are you reading from a document?

8 A Yes. It's Exhibit 3058-0120.

9 Q All right. Thank you.

10 Now both of these areas were designated as source areas
11 by the EPA, 1 and 2; is that right?

12 A That's correct.

13 Q Okay. Do you disagree with that, with those findings,
14 that particular finding?

15 A No. Based on the concentrations that you see, those
16 certainly match the criteria that the EPA defined, and those
17 are reasonable criteria, and those are source areas. I would
18 say, if anything, that they could be a bit bigger than what's
19 shown on the diagram.

20 MR. GROSSBART: All right. Actually put that back
21 up for a second, Neil.

22 DOCUMENT TECHNICIAN: (Complied with request.)

23 MR. GROSSBART: You just said something.

24 Take me back to the operational area again.

25 DOCUMENT TECHNICIAN: (Complied with request.)

1 BY MR. GROSSBART:

2 Q You've heard testimony in this courtroom about some
3 additional sampling that either wasn't or at least may not
4 have been provided to the EPA. Were you here for
5 Mr. Sullivan's testimony?

6 A I was.

7 MR. GROSSBART: All right. And, Neil, put up
8 Exhibit 4811, please.

9 DOCUMENT TECHNICIAN: (Complied with request.)

10 BY MR. GROSSBART:

11 Q And is this one of the documents you reviewed in doing
12 your work?

13 A It is, yes.

14 Q Can you generally describe what this document tells us
15 additionally about contamination in the operational area of
16 the Dyce site?

17 A Well, this Phase 1 soil investigation involved collection
18 of a number of samples around the operational area. There was
19 one in particular which was in the corner of the containment
20 pit for the flammable containment area, I believe is what they
21 called it.

22 Q All right. Let me stop you there and get a demonstrative
23 to show that.

24 Neil, 469, page 2.

25 DOCUMENT TECHNICIAN: (Complied with request.)

1 BY MR. GROSSBART:

2 Q Now this is the same photograph that we had up a minute
3 ago from 2004. Do you see that, Dr. Shanahan?

4 A Yes.

5 Q Now you just mentioned a containment area. Can you point
6 us out, what you're referring to on this photo?

7 A Well, it's the red dot which shows up pretty clearly in
8 this.

9 Q Then we don't need to add any more red.

10 A No.

11 Q Okay. And there were findings. Why don't you continue.
12 I interrupted you. I'm sorry.

13 A Well, in that particular sample, they drilled through the
14 concrete that was the base of the containment area and took a
15 soil sample directly underneath that, and they found high
16 concentrations of perc in the soil. Those concentrations were
17 above the EPA limits as far as defining source area, so the
18 source area really should be expanded to include that, and, if
19 they did additional exploration, it could possibly be expanded
20 more. It's hard to say.

21 Q All right. In reviewing at least the EPA's database, you
22 did not find that particular finding referenced anywhere in
23 the EPA's materials that you reviewed, did you?

24 A No, I didn't -- well, it's actually the MDEQ database,
25 but it's not in there, no.

1 Q Either one?

2 A No.

3 Q Okay. And the red dot is in a containment structure of
4 sorts? Is that how you understand this, based on the
5 testimony you've heard over the course of the week?

6 A Yes. It's a concrete containment structure, concrete
7 sides to it and a concrete floor.

8 Q Let me show you, in evidence, Exhibit 3674, page 31.

9 DOCUMENT TECHNICIAN: (Complied with request.)

10 BY MR. GROSSBART:

11 Q Do you -- you were at the Dyce site.

12 A I was.

13 Q And does this photo -- I think it's -- this is in
14 evidence as a photograph of the Dyce site, and you recognize
15 it as such; is that right?

16 A Yes.

17 Q Or at least part of it?

18 A Yes.

19 Q Can you see, in this photo, that concrete basin or a part
20 of it, or at least what you think is that concrete basin or
21 part of it?

22 A Yes. It's the basin that's over on the far left here.

23 Q Now you've been involved with Superfund investigations in
24 the past. I think you've told us that; is that right?

25 A That's right.

1 Q Is it your understanding of the rules and regulations
2 that apply to Superfund investigations that data like that set
3 forth in the ATC report, Exhibit 4811, were required to be
4 turned over to the government agencies?

5 A I would think so, yes. Generally if you're in a
6 Superfund situation, your data gets turned over to the
7 agencies.

8 MR. GROSSBART: Okay. Now, Neil, toggle back,
9 please, to the demonstrative that we had up a minute ago, 494,
10 page 6.

11 DOCUMENT TECHNICIAN: (Complied with request.)

12 MR. GROSSBART: Now -- and again focus on the basin
13 area. Right there.

14 DOCUMENT TECHNICIAN: (Complied with request.)

15 BY MR. GROSSBART:

16 Q In the photograph, you pointed out basically just the
17 beginning of that basin, in through here, and we saw the other
18 two basins right here. Have I oriented people right?

19 A That's right. Basically the photo, I think, was kind of
20 shot from this direction, and you could see the standing water
21 in those three basins.

22 Q Okay. Now right outside the basin is another well point
23 called MW-104. Do you see that?

24 A I do.

25 Q Now as I understand it, the sample here was soil. I

1 think you told us that.

2 A Yes.

3 Q All right. What kind of sample was MW-104? What kind
4 of, what kind of well was it?

5 A Well, MW-104 was a drilled well. They took both soil
6 samples at that and then have taken a number of groundwater
7 samples at that over time.

8 Q And are the results of that sampling at MW-104 reported
9 in any of the environmental data that you've seen?

10 A This well was installed as part of the remedial
11 investigation, and the RI report includes the first sets of
12 data that came from this well, and then it was subsequently
13 sampled over time as part of a regular monitoring program.
14 The RI appendices include, for example, the borehole log for
15 this --

16 Q Let's hang on.

17 It's a monitoring well. What does that mean? Does that
18 mean -- is it sampled once? Many times? Something in
19 between?

20 A It was sampled, sampled many times. There was, for a
21 while, at least for a while, a quarterly monitoring program,
22 and this well was sampled, at least the MW wells, in general,
23 were sampled regularly under that.

24 Q And in order to -- and you mentioned earlier an MDEQ
25 database?

1 A Yes.

2 Q And that's a large computerized document, I take it?

3 A Yes. It's a Microsoft Access database.

4 Q And have you looked at that?

5 A Yes.

6 Q What is it? Is it just a collection over time of things?

7 Describe it. What is it?

8 A It's a collection of a bunch of tables of data, and it
9 has information on the various wells, how they were
10 constructed and so forth, as well as the sampling data from
11 various times they've gone out and collected data, sent it to
12 the laboratory, and had the samples analyzed.

13 Q And one would need a computer, then, to go in there and
14 look at all of the different sampling points over time and
15 figure out what they show at any point in time; is that a fair
16 statement?

17 A You'd need the computer and the proper software.

18 Q Right. There's not a report that looks backwards in time
19 over all of that data? In other words, there's not a
20 document, other than the database itself, that captures all of
21 that data?

22 A Not that I've seen.

23 Q All right. So, for example, the RI was done in -- do you
24 recall the year, the remedial investigation?

25 A It was June '03, I believe.

1 Q And does the database continually update the findings
2 over the course of time?

3 A Yes. And, in fact, we've obtained several versions of
4 the database over years. You know, it's been updated several
5 times in the years since '03.

6 Q And what's the last iteration, if you will, the last,
7 roughly, time period that you've seen in the database?

8 A I can't remember if it was '07 or '08 or maybe even both.
9 I might have both.

10 Q All right. But after the RI and even the record of
11 decision was completed, right?

12 A Yes.

13 Q And do you recall the year of the record of decision?

14 A No, I don't.

15 Q Put up --

16 A I thought it was July '04.

17 Q I'll just see if I can refresh your recollection. It's
18 in evidence, but we'll put up, I believe it is, 30- --

19 THE COURT: Let's stop there for a minute.

20 MR. GROSSBART: Okay.

21 THE LAW CLERK: All rise.

22 (Recess taken from 09:29:38 to 09:44:16.)

23 (Open court.)

24 (Jury present.)

25 THE COURT: Please be seated.

1 Please continue.

2 MR. GROSSBART: Thank you, Your Honor.

3 Neil, let's -- I want to go back and pick up on
4 something.

5 Just closing in on something, Dr. Shanahan.

6 Neil, would you put up Demonstrative Exhibit 494,
7 page 6?

8 DOCUMENT TECHNICIAN: (Complied with request.)

9 BY MR. GROSSBART:

10 Q And I think we talked about these are the source areas as
11 designated by the EPA's record of decision but superimposed on
12 a photograph dated 2004. Have I got that right?

13 A Correct.

14 Q Now I want to talk about that particular source area
15 and -- you don't have to blow it up. Let's take that one
16 down.

17 DOCUMENT TECHNICIAN: (Complied with request.)

18 MR. GROSSBART: And, Neil, put up Demonstrative 614,
19 page 6, which is a different date of photography but with the
20 same ROD figure superimposed.

21 BY MR. GROSSBART:

22 Q Is that what we were talking about a minute ago where
23 MP-105 is located?

24 A That's right. It's in the area of the historic catch
25 pond.

1 Q And when they made the catch pond bigger -- Neil, put up
2 494, page 4.

3 DOCUMENT TECHNICIAN: (Complied with request.)

4 BY MR. GROSSBART:

5 Q Is that our same source area?

6 A That's correct, yes.

7 MR. GROSSBART: All right. Thank you. You can take
8 that down.

9 DOCUMENT TECHNICIAN: (Complied with request.)

10 BY MR. GROSSBART:

11 Q Now you're talking a little bit about MW-104, and I don't
12 need you to read the individual findings over time, but was
13 chlorinated solvent contamination found in the groundwater at
14 MW-104?

15 A Yes.

16 Q Can you just generally describe high, low, medium, what
17 it was?

18 A I believe it was, I believe it was high.

19 Q Okay. Now you talked earlier in your testimony about
20 things that you reviewed like boring logs and field notes and
21 things like that. Do you recall generally that testimony?

22 A Yes.

23 Q And I want to show you what I think is the boring log for
24 MW-104, and let's put up Exhibit 3050 at page 645, please.

25 DOCUMENT TECHNICIAN: (Complied with request.)

1 BY MR. GROSSBART:

2 Q Tell me what that is. There's a second page to it, too.

3 And explain what that is and what it shows us about MW-104.

4 The floor is yours.

5 A This is the boring log when you're out on the field
6 drilling a monitoring well. You'll generally have a geologist
7 or an engineer working with the drillers. They will actually
8 make a detailed record of what kind of soil you find and what
9 their observations are of the soil as they go down. You can
10 see here that there's a lithologic description, and that's
11 their --

12 Q Well, tell us what that is.

13 A Yeah, that's their transcribed field notes as to what
14 they saw in the way of soils and the different kinds of soils
15 that they encountered going down the borehole. You can see
16 there's a headspace, PID reading. The PID --

17 Q I'm sorry. I don't mean to talk over you, but when you
18 get to these big words, slow it down and tell us what you're
19 seeing.

20 A Okay. The "PID" stands for "photo ionization device."
21 This is one of those sniffers that I mentioned. So they take
22 readings to get a field screening value of how much volatile
23 organic compounds would be in the soil there.

24 MR. GROSSBART: Why don't you scroll down to the
25 bottom of the page, Neil.

1 DOCUMENT TECHNICIAN: (Complied with request.)

2 BY MR. GROSSBART:

3 Q And it says drilling date, June 24, 2002. Do you see
4 that reference?

5 A Yes.

6 Q And so is that the date they put the hole in the ground
7 the first time? What is that? What's the drilling date?

8 A That's the date they drilled the hole. That's the date
9 they put the hole in the ground.

10 Q And what did they find in the hole? Other than the
11 laboratory results which you've talked a little bit about,
12 what did the field investigators find in the hole that you
13 think is significant and bears on your opinion about the
14 operational area being contaminated?

15 A Well, we can probably just leave it right on this blowup.
16 But you can see a number of annotations in the field log, and
17 so they have, you know, that they, for example, found clay at
18 6 feet below ground surface. They described it here. It was
19 dark, black, stained clay. The next little bit, "No
20 recovery." The soil actually didn't come back up in the
21 drilling tool, so they didn't actually get a sample of soil to
22 look at, and that happens pretty regularly. But you can see
23 they keep on going down. They get down to the silty clay down
24 here at around 10 1/2 feet, and they noted a strong odor.
25 Below that it's, "Dark, black, stained." They continue on

1 down. You can see down about 16 feet, "Odor and staining
2 dropping out." And, in fact, the odors were high enough that
3 when you look at their field notes, they took the photo
4 ionization device and tested their work space to make sure
5 that the vapors weren't so high that it would be unsafe to
6 work.

7 Q Let me stop you there and put up, from the same exhibit,
8 Neil, page 407.

9 DOCUMENT TECHNICIAN: (Complied with request.)

10 BY MR. GROSSBART:

11 Q This isn't your writing, is it?

12 A No. These are -- this is another part of the RI
13 appendices, so this is part of those 18,000 pages, and --

14 Q Well, you mentioned, you mentioned concern about the odor
15 being too strong. Is that reflected in these notes?

16 A Yes, and you can see here, at 8:30 they began drilling at
17 MW-104. They have a detailed record of what went on in the
18 field. And here you can see, "Measuring head space on soil,
19 and many at 9,999-plus ppm." And then it says, "Take
20 breathing zone PID readings at work station and drill rig."

21 Q And why would field investigators need to do that?

22 A Well, one of the aspects of doing this kind of work is
23 that you have to have a detailed health and safety plan, and
24 you have to work safely. You're working around potentially
25 hazardous chemicals. And so this was a routine test, when

1 they start to smell vapors, to just check that it was still
2 okay to work or if they needed to put on a respirator. You
3 know, the workers needed to be protected.

4 MR. GROSSBART: Okay. Let's take that one down, and
5 let's move on to another topic.

6 DOCUMENT TECHNICIAN: (Complied with request.)

7 BY MR. GROSSBART:

8 Q At the beginning of your testimony, you mentioned three
9 opinions. You've talked about your opinion so far about the
10 operational area being contaminated, and now I want to move on
11 to the second opinion, which, as I recall, you said that
12 routine discharges over time from the catch pond account for
13 the contamination in the northwest corner. Got that straight?

14 A Yes.

15 Q Okay. Generally describe for us the types of things that
16 you looked at that support that opinion.

17 A Well, I looked at the aerial photographs. I obtained
18 aerial photographs, as well as was provided some, and looked
19 at those over time. I looked at some of the historical
20 accounts of the catch pond as they were -- or the catch pond
21 was basically nearing the end of its days and they were
22 getting ready to close it out. They did some studies. Those
23 were done by Kaivos, a local consulting firm. And I also then
24 looked at the technical data, the groundwater and soil data,
25 as well as the field, other field explorations that were done.

1 Q Now let me start with the aerial photographs and see if I
2 can't truncate this for everybody.

3 You were in the courtroom yesterday for Kris Stout's
4 expert testimony, were you not?

5 A I was.

6 Q And she commented on a number of aerial photographs.
7 You've heard that, right?

8 A Yes.

9 Q And you've looked at the same photographs, among others?

10 A Yes. I actually did my work independently before she did
11 hers.

12 Q All right. And do you agree with her testimony about the
13 features and so forth to the extent she pointed them out on
14 those photographs?

15 A Yes, I do.

16 Q Did you reach similar conclusions, or, indeed, the same
17 conclusions in doing your own work prior to even hearing
18 Ms. Stout's opinions some time ago?

19 A In general, yes.

20 Q Okay. In terms of your opinion about catch pond
21 discharges, I'm not going to go through each photograph one by
22 one, but can you generally describe what is significant to
23 your opinion about the various changes over time that are
24 reflected on the photographs? Just tell us generally, and we
25 can zoom in on something specifically, but why are the

1 photographs important? What do they show?

2 A Well, there were two things in particular about the
3 photographs that I thought were important and when I did my
4 analysis. One is the fact that they were cutting ditches and
5 so forth. Other, you know, that and other signs that they
6 were discharging liquids from the catch pond. There's various
7 kinds of evidence that Ms. Stout talked about, and I saw those
8 as well.

9 And then also, then, the progression of the devegetation
10 over those years from about, oh, 1975 going forward in time.
11 I noticed that same progression in devegetation, and that said
12 to me that something was going on that was, you know, killing
13 off the vegetation slowly but surely, and I eventually
14 concluded that that was the discharges from the catch pond.

15 Q Okay. And the vegetation kept getting worse? It
16 certainly never got better from '74 on?

17 A Yes, and it was really the progression that was
18 significant over those years.

19 Q Okay. I want to talk about one particular photograph,
20 now. It's the, I believe it's the last photograph we have
21 that's good before the catch pond was closed. It's 5036 in
22 evidence.

23 Neil, please put it up.

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 ///

1 BY MR. GROSSBART:

2 Q And do you recognize this as the July 1983 photo?

3 A Yes, I do.

4 Q And this is one of the photographs you looked at early on
5 in your work?

6 A Yes.

7 MR. GROSSBART: All right. Now let's -- give me
8 about like yay, Neil, please.

9 DOCUMENT TECHNICIAN: (Complied with request.)

10 BY MR. GROSSBART:

11 Q Now -- and, again, I don't want you to repeat what
12 Ms. Stout testified to, but there appear to be these lighter
13 areas, almost white on the photograph. Do you see what I'm
14 referring to?

15 A Yes. In particular, there's white areas here.

16 Q Have you heard anything in the courtroom over the past
17 week that you believe explains or bears on those whited areas?
18 And, if so, tell us what it is.

19 A Well --

20 Q And I don't mean to limit you to what you heard in the
21 courtroom. Based on other documents you've seen, obviously.
22 Go ahead.

23 A Well, based on some of the things I've heard in the
24 courtroom, but really also what I learned when I first started
25 to look at the information and continued to look at it, the

1 Kaivos reports, in particular, but this is confirmed by other
2 information, talk about the fact that, you know, the pond was
3 acid. They needed to add lime to it to neutralize it, to get
4 the acidity down. And so when you add lime, which is a
5 calcium chemical, to a pond that has hydrochloric acid in it,
6 among other things, you can get calcium chloride. That's the
7 white salt that's used as a sidewalk deicer. So -- and there
8 are other chemicals that went in there which would form salts
9 like that, and so there's a number of white salts that could
10 have been produced by the mix of chemicals between the acids
11 and what they used to neutralize it. And so this seems
12 consistent with that, to me, that they had salty water from
13 the mix of chemicals in the pond. It got discharged out from
14 the pond over the side, and, when it evaporated, it left
15 behind these white deposits.

16 Q Did you hear testimony earlier this week from witnesses
17 about a hydrochloric acid spill that happened after the catch
18 pond had been enlarged?

19 A Yes, I did.

20 Q And you recognized -- and this 1983 photo is post or is
21 after that catch pond enlargement? I think it's undisputed
22 that it happened by 1981; is that right?

23 A Yes. This is after the enlargement.

24 Q Okay. So acid in a catch pond, lime to neutralize acid,
25 produces this white crystalline combination?

1 A Yeah. Calcium chloride, so similar to table salt but a
2 little bit different. Not sodium chloride, which would be
3 table salt, but calcium chloride.

4 Q Okay. And it's -- that's a -- it would be something you
5 could buy in a store and sprinkle on ice in crystal form?
6 That's the same chemical, essentially, is it not?

7 A Yes, a lot of the sidewalk deicer, I believe, is calcium
8 chloride.

9 MR. GROSSBART: All right. Now, Neil, just put the
10 first page of Exhibit 3191 on the board, please.

11 DOCUMENT TECHNICIAN: (Complied with request.)

12 BY MR. GROSSBART:

13 Q Have you found any evidence of crystalline substance in
14 the northwest corner?

15 A Yes. ATC has a number of -- did a number of soil
16 borings. The PZ soil borings in the northwest corner and the
17 well logs for those indicate white crystals.

18 Q All right. And we won't go through all of the well logs,
19 but is the white, is that white crystal findings in every well
20 log in the northwest corner or just some?

21 A No, it's just some of them. It's not all of them.

22 Q All right. And do you believe the white crystals that
23 were found in some but not all of the northwest corner samples
24 were there naturally?

25 A Obviously you could get them there naturally but they're

1 not reported in the other logs, either from the PZ logs or
2 other logs, and so they specifically called out the fact that
3 there were white samples in the shallow -- excuse me, white,
4 white crystals in the shallow soil samples in selected PZ
5 borings in the northwest corner, and certainly suggests an
6 association with the same white patterns you see here in this
7 1983 photograph.

8 Q All right. Let me just show you one -- I just want to --
9 let's just do one well log.

10 Put up page 36 of this ATC report, and blow that up to
11 the extent you can, Neil.

12 DOCUMENT TECHNICIAN: (Complied with request.)

13 MR. GROSSBART: Give me this area generally, Neil,
14 please.

15 DOCUMENT TECHNICIAN: (Complied with request.)

16 BY MR. GROSSBART:

17 Q This -- tell us what this document is, and refer us to
18 what's relevant to the point you're making.

19 A Well, again, this is one of the field logs, boring logs
20 that was prepared by the engineer geologist for ATC. And you
21 can see, "Top 1 foot, dark brown, hard clay, white crystals."
22 And you see similar kinds of notations in some of the other PZ
23 logs.

24 MR. GROSSBART: Okay. And, Neil, please put up --
25 to the top of that.

1

2 DOCUMENT TECHNICIAN: (Complied with request.)

3 BY MR. GROSSBART:

4 Q Can you tell from this boring log what the well location
5 is here?

6 A Yes. Right, right in the very middle. I overlooked it
7 at first. It's PZ-10, SB-10, Soil Boring 10, which was then
8 completed as Piezometer 10.

9 MR. GROSSBART: All right. Just for -- just to
10 orient us, Neil, would you put up Exhibit 4400, page 60? All
11 right. Can you rotate that one click counterclockwise. All
12 right. And expand it, please.

13 DOCUMENT TECHNICIAN: (Complied with request.)

14 BY MR. GROSSBART:

15 Q This is an ATC diagram. Do you recognize this outline as
16 at least generally the northwest corner area?

17 A Yes. That's the northwest corner source area footprint.

18 Q Okay. And is that the same PZ-10 referred to in the soil
19 boring log we just saw?

20 A Yes, it is. Same location.

21 MR. GROSSBART: All right. You can take that down,
22 Neil. Thank you.

23 DOCUMENT TECHNICIAN: (Complied with request.)

24 BY MR. GROSSBART:

25 Q You mentioned Kaivos. I want to put up one page from a

1 Kaivos letter. It's 856A, page 75.

2 And, Neil, please blow up on the top half of that.

3 DOCUMENT TECHNICIAN: (Complied with request.)

4 MR. GROSSBART: Now the letter is dated -- highlight
5 the date, please. Okay.

6 DOCUMENT TECHNICIAN: (Complied with request.)

7 BY MR. GROSSBART:

8 Q I read that as August 6, 1985. Is that how you
9 understood it?

10 A Yes.

11 MR. GROSSBART: All right. What -- this -- Neil,
12 highlight this for us, please. From there, the first
13 sentence, to -- yeah, just, "North sides of the fenced plant
14 site." Stop there. And scroll down, please, and add that to
15 that. Okay. And you can highlight that.

16 DOCUMENT TECHNICIAN: (Complied with request.)

17 BY MR. GROSSBART:

18 Q All right. Tell us your take-away, if you will, from
19 this particular report in 1985.

20 A Well, they took a number of soil samples and checked the
21 pH, and you can see -- actually you can't see, but -- I take
22 that back. You can just see Samples 4 and 5 poking through,
23 and they were really acid, and those are up in the vicinity of
24 the northwest corner. They're kind of just past that little
25 apex, that point in the fence.

1 Q Well, let me stop you --

2 A And --

3 Q I'm sorry. Let me stop you there so you can show us
4 where you believe that's referring to.

5 And why don't we put up, for these purposes, the diagram,
6 the 1983 photo that we had up a minute ago, which is 5036.
7 And again, zoom in on this.

8 DOCUMENT TECHNICIAN: (Complied with request.)

9 BY MR. GROSSBART:

10 Q And you said the other side of the apex. Did I hear you
11 correctly?

12 A Yeah. They generally took --

13 Q Just generally draw it.

14 A Yeah -- took samples in this general area.

15 Q Okay.

16 A And others as well.

17 MR. GROSSBART: All right. Let's go back to the
18 Kaivos document, not what we've highlighted.

19 DOCUMENT TECHNICIAN: (Complied with request.)

20 BY MR. GROSSBART:

21 Q Can you explain, if acid was in the catch pond -- well,
22 let's -- I don't want to -- I'll let you do the talking.

23 What does this suggest to you? What does this
24 demonstrate to you that's relevant to your opinion that the
25 catch pond is the source of contamination for perc and other

1 chemicals migrating outward toward the northwest corner?

2 A Well, the catch pond was acid. They have other reports
3 on the catch pond, and, you know, that H -- that hydrochloric
4 acid had been spilled and reached the catch pond. I think
5 they also mentioned sulfuric acid. And so the pond was acid.
6 They indicate right here that acid residue from catch pond has
7 significantly affected the soil pH. That suggested strongly
8 to me that they were discharged liquids from the catch pond.
9 And you see that evidence in those very low pHs, very acid
10 soils that are off from the corner of where the catch pond
11 was.

12 MR. GROSSBART: Now let's take that down.

13 DOCUMENT TECHNICIAN: (Complied with request.)

14 BY MR. GROSSBART:

15 Q Let me ask you this question. There are other Kaivos
16 studies that refer to not finding halocarbons above detection
17 limits, or words to that effect. Do you recall looking at
18 material like that?

19 A Yes.

20 Q And you heard Dr. Powell testify about that as well, did
21 you not?

22 A I did.

23 Q And just generally tell us this. Does that give you any
24 pause or concern about your opinion?

25 A No, it doesn't.

1 Q Well, explain. Explain why, please.

2 A Well, it was one analysis, one particular date. We don't
3 know where the analysis was taken. We don't know the method
4 detection limits. We really don't know very much about the
5 sample at all, and so there's really not enough information to
6 really evaluate that sample, how accurate it would have been,
7 how representative it would have been. So I'm not concerned
8 about, you know, the fact that a single sample of rather
9 unknown quality didn't show halocarbons.

10 MR. GROSSBART: All right. Let's move off that for
11 a minute, and let's go to 614-6, Neil, Demonstrative 614-6.

12 DOCUMENT TECHNICIAN: (Complied with request.)

13 BY MR. GROSSBART:

14 Q And I want to talk about another source area. This is
15 the May 1979 photograph with the same EPA/MDEQ source area
16 diagram superimposed over the top of it, is it not, sir?

17 A Yes.

18 Q All right. And we haven't heard much about this little
19 fellow right here. What has the EPA -- just generally, has
20 the EPA concluded that that is a source area as well?

21 A Yes. The EPA has identified that as a source area, also.

22 Q And do you agree with that particular finding of the EPA?

23 A Yes, I do. There is a direct-push sample. I think it's
24 DP-63, at that spot, which shows it meets the criteria that
25 they defined and that it is a source area.

1 Q Is there any indication to you from this aerial
2 photograph that supports the proposition that catch pond
3 discharges have led to or contributed to that source area?

4 A Yes. You can see that in the devegetated pattern.
5 Ms. Stout talked about this the other day, that there are sort
6 of two lobes, if you like. There is one here, and there is
7 one here.

8 Q Let's talk about the second one, because we're talking
9 about -- I want you to focus on the devegetation going to that
10 one.

11 A Yes. And so there is clearly devegetation that leads up
12 to the source area on -- the smaller source area that the EPA
13 defined.

14 MR. GROSSBART: And, Neil, if you go to the
15 following photograph in time, page 8 of 614?

16 DOCUMENT TECHNICIAN: (Complied with request.)

17 BY MR. GROSSBART:

18 Q Do you still see the devegetation?

19 A Yes. In fact, it becomes clearer. The connection
20 becomes clearer in this 1981 photo. Basically the devegetated
21 area leads right to that green circle.

22 MR. GROSSBART: All right. Let's take that one
23 down, please.

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 ///

1 BY MR. GROSSBART:

2 Q Okay. Well, if perc is, among other things, among other
3 chemicals, is being discharged from the catch pond, I take it
4 it has to get there first? That's just logical, right?

5 A That's correct.

6 Q All right. Have you considered, based upon your review
7 of the testimony and evidence and whatever else, ways and
8 means for perc to get to the catch pond at various points in
9 time over the course of which the catch pond was in business,
10 so to speak?

11 A Yes, I have.

12 Q Why don't you describe what you take from the scientific
13 data or the evidentiary record that leads you to conclude that
14 perc made its way to the catch pond in the first place. Can
15 you generally talk about that?

16 A Certainly. Well, first of all, from past site
17 experience, I've seen other sites where you get to a, kind of
18 a low, quiet area in the flow from a site; so, for example, a
19 wetlands or a pond or something like that, a place where water
20 will get quiet. And if wastewater from the site is going to
21 that, you often see things accumulate.

22 And, you know, we've talked about the properties of perc
23 and the fact that it's sparingly soluble, and so, for example,
24 if you have perc on the pavement and you wash it down with a
25 hose, what you're going to have is little bitty bubbles of

1 perc getting carried by that stream of water. So the perc is
2 going to be almost like suspended. It's almost like suspended
3 sediment, how water will carry mud, and then, when the water
4 gets quiet, the mud settles out and you get a clay, you know,
5 deposit. It would be the same kind of thing.

6 You would have the water carrying little bubbles of perc,
7 and because they're just small bubbles, they're carried along
8 with the water. But when they get to a quiet place like the
9 catch pond, then they, you know, quietly sit there. They
10 start to settle out. They're heavier than water, so they can,
11 you know, they can be carried by the flowing water with the
12 turbulence, but then when they get to the catch pond, they can
13 settle out, and you'll get an accumulation of the dense
14 liquids down at the bottom of the pond. And so in the low
15 places in the -- or the low place in the pond, you'll get an
16 accumulation of separate-phase perc.

17 Q And you heard witnesses, various witnesses -- excuse me.

18 You've heard various witnesses talk about the hosing down
19 of chemicals in the ordinary course of business over the
20 course of the last week, have you not?

21 A Yes, I have.

22 Q And you've seen Dyce's 104(e) responses to the
23 government, talking about hoses and rinsewater and things
24 going to the catch pond?

25 A Yes, and it's really those kinds of wastewater streams

1 where you've got rinsewater, you've got hose -- you know,
2 things that have been hosed down, where you can get these
3 little bubbles suspended in the water. They're not going to
4 evaporate particularly strongly because they're in the water.
5 The water is above them, or between them and between the
6 bubbles and the atmosphere, and so you get this ability to
7 carry little bubbles of perc down to the catch pond.

8 Q And that's sort of consistent and typical with patterns
9 you've seen just in your experience generally doing this kind
10 of work? Did I hear you say that?

11 A Yes. I've seen that kind of phenomenon at a lot of
12 sites. It's really quite a common phenomenon.

13 MR. GROSSBART: And, Neil, would you just -- let's
14 just go back to one of the earlier demonstratives we talked
15 about. 469, page 2, is from the ATC diagram.

16 DOCUMENT TECHNICIAN: (Complied with request.)

17 BY MR. GROSSBART:

18 Q That's right under a catch basin?

19 A That's right.

20 Q Are we seeing the same thing there, in effect?

21 A In fact, we're seeing really what looks like the exact
22 same thing. Dribs and drabs of material get hosed down and
23 get carried to that containment area, and that particular
24 boring has concentrations of perc that are above that soil
25 criterion that the EPA said. And, if you remember, Dr. Powell

1 talked about that as being sort of the dead-certainty kind of
2 standard, that there was DNAPL there. Well, the soil sample
3 right below that basin has that, you know, DNAPL signature,
4 and it seems clear to me that what happened is wash waters and
5 rinsewaters and so forth carried perc down to that basin. The
6 perc settles out, seeped through cracks and breaks in the
7 concrete, and you see this indication that separate-phase
8 perc, DNAPL perc, came out of that basin and contaminated the
9 soil right under the basin.

10 MR. GROSSBART: All right. Now in the case of --
11 let's go back to our ROD diagram, Neil. Page 121 of the ROD,
12 3051-121. And blow up on the fun stuff.

13 DOCUMENT TECHNICIAN: (Complied with request.)

14 BY MR. GROSSBART:

15 Q All right. We've talked a little bit about MP-105 and
16 that's the catch pond? That's the source area over the catch
17 pond, in effect, right?

18 A The source area right near the catch pond, yes.

19 Q All right. Let's focus on that.

20 And there was not perc detected underneath there until
21 you got quite deep. Do you recall hearing that testimony and,
22 I mean --

23 A Well, that's not quite correct.

24 Q So -- well, tell me what's correct, and tell me about the
25 findings generally there. I don't necessarily mean the

1 numbers, but the findings there and how they fit in with your
2 opinion that perc and other chemicals over the course of time
3 made their way to the historic catch pond.

4 A Well, this was one of the membrane interface probes.
5 They got a bit of a hit, if you like. They found evidence
6 of -- well, the ECD detector spiked up a bit right at the
7 interface between the fly ash. So this was the fill that was
8 put in after the pond was closed. So basically once they got
9 to the original soil, they got a bit of a hit there. And
10 then, you know, it kind of flat-lined. There wasn't any
11 detection until you then got down to the bedrock surface, and
12 then there was a good, high hit there. And they actually took
13 a groundwater sample at that location of the groundwater that
14 came off the bedrock surface.

15 Q All right. And what's, what's, based upon what you
16 understand from looking at all of the evidence and data and so
17 forth, what's happened to the catch pond area over time in
18 terms of excavation or changes?

19 A Well, you know, we don't know exactly what happened.
20 There aren't records. There is -- there are some documents
21 which indicated that, you know, they needed to get the sludge,
22 the material in the catch pond out before they redeveloped it,
23 but then there's no records really to say whether that
24 happened, but it's a logical conclusion. You wouldn't really
25 want to build on it. I think Mr. Johnson described it as

1 muddy and yucky. It wouldn't be a very good thing to build
2 on. So presumably that was removed, and certainly the area
3 has been redeveloped, and, you know, fill was brought in, and
4 the whole area was changed.

5 Q And before that, the catch pond actually was enlarged?

6 A That's right. It had an early configuration in the '70s
7 and then was enlarged in 1981 --

8 Q All right.

9 A -- I believe.

10 Q And is the photographic evidence that you've seen --
11 well, I'll strike that.

12 Is it clear from the photography to you that in enlarging
13 the catch pond, it was, in effect, excavated to make it
14 bigger?

15 A Yes. I mean, it -- you know, the area within the berms
16 was expanded, and that would be a low area, so it looks like
17 they had to do some excavation there.

18 Q Now there's another sampling point in the catch pond area
19 called MP-129. I don't think it involved a laboratory sample,
20 but it didn't show a hit for perc. Could you tell me whether
21 that is an anomaly that's problematic, or do you have some
22 thoughts on that?

23 A Well, it's, you know, it's, I think it's about 15 feet or
24 16 feet away from MP-105. The -- well, if we -- when we
25 consider what various witnesses have said, it sounds like

1 there was some sort of a liner, at least at some time,
2 underneath the pond. And, you know, liners are actually very
3 tricky to construct. A good liner is actually very difficult.
4 I spend about four lectures in my course on hazardous waste
5 site management talking about the difficulties and care that's
6 needed to construct liners.

7 But a liner under there would be at least partially
8 effective. You wouldn't expect it to leak everywhere. It
9 only has to leak one or a few places to be an ineffective
10 liner, and so it doesn't particularly surprise me that you
11 don't find, say, perc all the way from that surface down to
12 the bottom. In fact, I wouldn't really expect it because I
13 would expect that it would be localized where the liner leaked
14 or where the edge of the liner occurs. So that kind of
15 localized pattern is really what I would expect to find, and
16 so I -- you know, there's only really two, two samples, two MP
17 samples in that location, and I think you would, you know,
18 need to do more samples before you could really, you know,
19 fully characterize what was going on there.

20 Q Okay. Let's -- I want to switch gears a little bit and
21 talk about a couple of things that came up in Dr. Powell's
22 testimony.

23 And let's put up Demonstrative 279, page 7.

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 ///

1 BY MR. GROSSBART:

2 Q And I want to talk about two things, specifically as
3 follows.

4 First of all, orient us to what this demonstrative is
5 attempting to show generally, and then we'll ask you some more
6 specific questions.

7 A Well, this is another pie chart, and it shows the
8 distribution of chemicals in various groundwater samples that
9 were collected in the, you know, in the operational area in
10 the northwest corner. This one just shows the distribution.
11 It's not scaled to the concentration, so they're all the same
12 size. You don't have information on the concentra-, you know,
13 the overall concentrations in these particular samples, but it
14 does show the mix of the chemicals.

15 Q All right. Let me see if I can break that down a little.
16 We've got different colors. Well, perc is red.

17 A Perc is red.

18 Q And we have different colors. We'll put aside yellow for
19 other chlorinated solvents; is that right?

20 A Yes, and those are the degradation byproducts from when
21 perc is biodegraded.

22 Q All right. We'll talk about -- let's talk about that for
23 a second.

24 Left to itself in the right conditions, perc changes over
25 time? It degrades; is that right?

1 A That's right. It's -- you know, the chlorines on the
2 perc come off, and you go from perc to trichloroethylene to
3 dichloroethene as basically bacteria take chlorine atoms off
4 of the molecule.

5 Q All right. And do I understand you correctly that what
6 you're showing here, among other things, is, for example, the
7 ratio of perc on the one hand to some of these degradation
8 products on the other?

9 A Yes. That shows in here.

10 Q And you also have yellow for BTEX, and that's showing in
11 comparative ratios to BTEX as well? Is that what we're seeing
12 here?

13 A Yes.

14 Q All right. Now you've heard -- is it true, as a general
15 proposition, based upon your review of the scientific data,
16 that the area around PT-2 and 6 is kind of ground zero in the
17 northwest corner, if you will? Is that a fair statement?

18 A That's a fair statement.

19 Q All right. If you're just looking at ratios and looking
20 at PT-2 and PT-6, which pie that's on this chart is the most
21 similar to PT-2 and PT-6?

22 A Well, there are three pies which have that signature of
23 basically mostly red, PT-2 and PT-6, and then MP-105, the
24 groundwater sample that was collected below the former catch
25 pond.

1 Q All right. Let me ask you a couple questions here.

2 Start with BTEX. We don't see the yellow coloring that
3 you have for BTEX out in the northwest corner. Why not? What
4 is it about BTEX that helps you understand that condition?

5 A Well, it's a little bit complicated, but these compounds
6 all biodegrade. Bacteria will basically cause chemical
7 reactions that make these chemicals turn into other chemicals.
8 The BTEX are very readily biodegraded. They're pretty easy to
9 break down, and they're broken down in reactions with oxygen.
10 So, in essence, the carbon becomes carbon dioxide, and you
11 get -- it's really the same kind of reactions that you would
12 see in a compost pile, how a compost pile breaks down organic
13 matter. So it is what is known as an aerobic reaction, and
14 those move along pretty quickly.

15 So what you see is a pattern where the BTEX is up on the
16 site, and that's, you know, where there's high concentrations
17 of these BTEX compounds. Groundwater is flowing generally to
18 the northwest, and so what you see is those compounds
19 disappear as they get biodegraded.

20 Q What about BTEX in the catch pond? Where would it go if
21 spilled BTEX went into the catch pond?

22 A Well, again, if you remember back to our glass of or
23 pitcher of perc on the bottom, water in the middle, BTEX on
24 the top, BTEX is a floater. BTEX is going to be on the
25 surface. It's very volatile. It evaporates readily, so that

1 stuff is going to evaporate off of the top of the pond for the
2 most part.

3 Q Might not even make it out there because it's first in
4 line for evaporation?

5 A Yes. It could well evaporate off of the pond,
6 particularly -- the pond, at least as I understand it, wasn't
7 drained that often, and it would have some time to sit out
8 there and evaporate.

9 Q Okay. And let's talk about the perc byproducts or
10 biodegradation products. There are, if I'm understanding this
11 pie chart right, there is, for example, biodegradation going
12 on here and here. We see, we see more colorful pie, right?

13 A Yes.

14 Q All right. Less so here? Is that what you're depicting
15 on this demonstrative?

16 A Yes. Much less so.

17 Q And what is it about the conditions or the perc
18 concentrations at or around PT-2 and 6 that, in your judgment,
19 explain why there's less degradation, perc degradation there
20 than higher and lower on the chart?

21 A Well, people have studied this, and there's scientific
22 literature about this, and when you have DNAPL, in essence the
23 concentrations are too high. You poison the bugs. You poison
24 the reactions. And so DNAPL doesn't get biodegraded very,
25 very much at all, if at all. So it's a different situation

1 between DNAPL and then chemicals that are dissolved in the
2 groundwater. The dissolved chemicals will be biodegraded
3 fairly readily, but the DNAPL is not. And this would
4 indicate, of course, that we're right at a DNAPL source.
5 That's why those concentrations or those mixes are so
6 dominated by perc.

7 Q Now in terms of wastewater getting to the catch pond and
8 moving chemicals with it and so forth, have you seen, in the
9 record, in the evidentiary record you reviewed and what you
10 witnessed in court, and can you speak to sort of the
11 wastewater issue generally and Dyce's wastewater management
12 challenges? What have you seen in those regards that sort of
13 just bear on the issue of wastewater management and how it
14 might be pertinent to your opinion?

15 A Well, clearly they were generating wastewater. There's
16 discussion in the Versar report, for example, of the fact that
17 they had various kinds of rinsewaters. There is discussion in
18 Dyce's response to the 104(e) request from the EPA, again,
19 that they had various kinds of rinsewaters, as well as then
20 they also had stormwater that was collecting and going to the
21 catch pond.

22 MR. GROSSBART: Let me show you Exhibit 382 in
23 evidence.

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 ///

1 BY MR. GROSSBART:

2 Q And is this one of the documents you've seen in doing
3 your work?

4 A Yes. This is a report of a site visit by Montana
5 Department of Health and Environmental Sciences.

6 MR. GROSSBART: All right. Neil, would you go to
7 the next page, please?

8 DOCUMENT TECHNICIAN: (Complied with request.)

9 MR. GROSSBART: Excuse me. Page 3 of the document.
10 Highlight the top, first full sentence.

11 DOCUMENT TECHNICIAN: (Complied with request.)

12 BY MR. GROSSBART:

13 Q Is that MDEQ finding and statement there consistent with
14 your take-aways from looking at all of the evidence and data
15 that's available?

16 A Yeah. This dates from 1992 but clearly would be
17 indicative of kind of what their practices were and that they
18 encountered problems with their wastewater management during
19 that site visit. And as they say here, "Clearly Dyce Chemical
20 does not have control of its waste streams." That would be
21 these water streams.

22 Q Okay. Let's move on, then, to the third and last of your
23 opinions.

24 Take this down, Neil.

25 DOCUMENT TECHNICIAN: (Complied with request.)

1 BY MR. GROSSBART:

2 Q Now you've heard testimony from Dr. Powell that a very
3 large volume, one-time spill flowed through a ditch along the
4 railroad spur to the northwest corner, probably sometime in
5 1975, '76, or '77, and that that spill explains the
6 contamination here. I don't mean to put words in his mouth,
7 but is that what you heard as well?

8 A Generally something like that, yes.

9 Q And I take it you disagree with that?

10 A Yes. I don't think that was the case at all.

11 Q All right. Tell me why.

12 A Well --

13 Q Tell us why.

14 A We've talked about the properties of perc and the fact
15 that this perc is really a very runny fluid. It's less
16 viscose than water. It would very readily infiltrate into the
17 soil if it went down that ditch as they have said, and you'd
18 see that evidence in the analytical data. You would see
19 concentrations that would reflect the fact that perc had
20 traveled down that ditch, soaked into the ground, and then
21 acted as a source to continue contaminating groundwater. So
22 if that had happened, I'd expect to see, you know, some very
23 high concentrations in those wells near that ditch.

24 Q Well --

25 A And that doesn't happen.

1 Q Well, let's see if we can cut through this a little bit.
2 Let me put up page 464, page 2. It's a demonstrative that
3 Ms. Stout used yesterday. And again, talk to me generally
4 about MW-101 and BH-F in terms -- just their relativeness to
5 one another in terms of the contamination there.

6 A Well, BH-F is highly contaminated. It has high
7 concentrations of organic, organic, chlorinated organic
8 compounds; a perc concentration that's well above the
9 groundwater criterion that the EPA set.

10 MR. LYNCH: Again, Your Honor, can we get a
11 reference to the document the witness is reading from?

12 BY MR. GROSSBART:

13 Q All right. Were you reading from a document bearing on
14 this?

15 A I was looking again at that same diagram that was in the
16 Maxim report.

17 Q Okay. What about MW-101 relative to BH-F?

18 A MW-101 has much lower concentrations of perc, you know,
19 as opposed to -- well, Borehole F has concentrations of, you
20 know, 13,000 of perc. MW-101 has concentrations of perc that
21 are in the 10s. A little bit of variation. It was sampled a
22 number of times, but, you know, in the ballpark of, oh, 10 to
23 80, so much, much lower concentration. Much less perc than
24 you see --

25 MR. LYNCH: Your Honor?

1 THE WITNESS: -- in Borehole F.

2 MR. LYNCH: MW-101 isn't in the Maxim report. Are
3 you looking at a different document for that?

4 THE WITNESS: Yes. I have a spreadsheet, an excerpt
5 from my spreadsheet that I developed from the Montana DEQ
6 data.

7 MR. LYNCH: Do you have a copy of that, Counsel?

8 BY MR. GROSSBART:

9 Q You took what you're reading for for MW-101 as the data
10 you extracted from the DEQ database?

11 A That's correct.

12 Q And you put a disk like this on your computer and wrote
13 down, on a piece of paper, the MW-101 findings; is that, in
14 effect, what you did? Maybe a little fancier than that?

15 A Yeah. I didn't write it down on a piece of paper, but I
16 transferred data from the database to a spreadsheet where it
17 was just much easier to work with.

18 Q It's not your data? It's the MDEQ's data, right? Just
19 so it's clear?

20 A Yes.

21 MR. GROSSBART: All right. You can have mine,
22 Mr. Lynch (handing).

23 BY MR. GROSSBART:

24 Q All right. In terms of its location on this diagram,
25 we've heard terms about upgradient, downgradient. Can you,

1 from that perspective, explain the orientation of MW-101 to
2 BH-F spatially, if you will?

3 A Well, the general direction of groundwater flow is
4 roughly in this direction, up towards the northwest. Okay.
5 And you can see that Borehole F, the contaminated borehole is
6 downstream of this area, downgradient, excuse me, of this area
7 where Ms. Stout showed that wastewater from the pond, from the
8 catch pond, would have gone. Okay.

9 MW-101 is not downgradient of that area. It is,
10 however -- let me just draw it in here. That is the -- that's
11 the ditch. It is downgradient of the ditch, and so if perc
12 had traveled down that ditch in the hundreds of gallons that
13 they talk about, that ditch would be contaminated with perc,
14 and then you would see MW-101 to be highly contaminated with
15 perc as well.

16 MR. GROSSBART: Okay. Now let's take -- you can
17 leave that up. Actually, leave the ditch there, too.

18 DOCUMENT TECHNICIAN: (Complied with request.)

19 BY MR. GROSSBART:

20 Q Would it be, given all this mapping and whatnot and so
21 forth, would it be possible to go to the site and figure out
22 where that ditch was historically and test it?

23 A Well, you certainly wouldn't be able to do it visually,
24 but as you can see, if you have all these maps, we figured out
25 where things were historically. It would be a simple matter

1 to go out, use a global positioning system device, which is
2 what they use to figure out where they put their wells after
3 they're done, and go and find where the ditch had been and put
4 in some of these relatively inexpensive direct-push borings
5 and sample that ditch right along the length of it.

6 Q And if the surface there was now hard or concrete, you
7 could drill through that, I assume? We've got -- we've come
8 that far with technology, have we not?

9 A Yes. I mean, you can see from the various borings that
10 were put on the site, they've basically gotten through
11 everything. Some of it has been a little bit harder,
12 obviously, but they've gotten through everything and put in
13 bore holes all over the place.

14 Q All right. Why don't we just -- let's go back to, let's
15 get back down from 20,000 feet down to the ground level.

16 And, Neil, why don't you put up 3674, page 52.

17 DOCUMENT TECHNICIAN: (Complied with request.)

18 BY MR. GROSSBART:

19 Q Now, again, you were at the site --

20 A That's correct.

21 Q -- this summer.

22 And this is the railroad spur coming from the south and
23 moving to the northwest. Have I oriented that right?

24 A Yeah. You can just barely make out the edges of the rail
25 ties and then the line where the rail itself is.

1 Q All right. And you know from your work that fill was put
2 in this area in order to extend the railroad track and
3 reconfigure the plant over time?

4 A Yes. You can see that in the aerial photographs, and
5 when you go to the site, it's very clear. You can see this
6 kind of rise here in the land surface where the fill was
7 placed.

8 Q All right. And so unlike, for example, the catch pond
9 area -- well, strike that.

10 In the ditch, it's sort of just the other side of these
11 railroad tracks? You can't really see it well in this photo,
12 but if this is the track, is it your understanding that the
13 ditch is the other side of it?

14 A Yeah, just, just -- well, yeah, over on the other side
15 from this viewpoint.

16 Q Okay. And so that ditch, if I'm understanding these
17 photos correctly, that ditch is underneath the fill that was
18 added in later years?

19 A That's correct.

20 Q Is it your belief there are areas along Soco's -- the
21 ditch that Soco uses as the basis for its opinion that haven't
22 been excavated but actually, I think in the words of
23 Mr. Sullivan, were entombed by fill that has come later?

24 A Yes. I'd expect, you know, essentially all of the soil
25 beneath that ditch would still be there. Perhaps a little bit

1 might have been scraped off the surface. They might have
2 gotten some topsoil, but I would expect most of that soil to
3 be there and then other soil placed on top of it.

4 Q And in your judgment, if the volumes of perc that Soco
5 alleges traveled down that ditch really happened, more likely
6 than not a program of ditch testing would reveal some evidence
7 of that?

8 MR. LYNCH: Asked and answered.

9 THE COURT: Overruled.

10 THE WITNESS: Yes.

11 BY MR. GROSSBART:

12 Q You have not seen, in your work, any evidence that
13 suggests that Soco or its consultants have attempted to do so,
14 have you?

15 A No.

16 MR. GROSSBART: I have nothing further, Your Honor.

17 THE COURT: You may cross.

18 CROSS-EXAMINATION

19 BY MR. LYNCH:

20 Q Good morning, Dr. Shanahan.

21 A Good morning.

22 Q First I'd like to just deal with some of these
23 distractions here.

24 It's your opinion that it's more likely than not that the
25 contamination that EPA found in the northwest corner source

1 area originated from an event or events that happened prior to
2 1987, isn't it?

3 A That's correct. I wouldn't say an event, though. I
4 would say it was the more or less continuous process,
5 intermittent but continuous process of discharge from the
6 catch pond that occurred over time.

7 Q It happened prior to 1987, though?

8 A Yes, prior to the closure of the catch pond.

9 Q You started the day talking about samples from the
10 operational area and discussing what was found in those.
11 Isn't it true that the contaminants of concern identified by
12 EPA for the Lockwood solvent site are perc and its degradation
13 products?

14 A Yes.

15 Q The BTEX compounds you discussed have not been identified
16 as contaminants of concern for the remedial investigation,
17 have they?

18 A No. They aren't carried in the groundwater plume because
19 of the biodegradation.

20 Q And you understand, in this action, Soco is not seeking
21 coverage for contamination found in the operation area, don't
22 you?

23 MR. GROSSBART: Objection to that. He hasn't given
24 an opinion on what Soco is seeking coverage on.

25 THE COURT: Yeah. I'll sustain it.

1 BY MR. LYNCH:

2 Q You talked about your findings from a couple of samples
3 this morning in the operational area, MW-104 and Borehole M.
4 Is the mixture of chemicals that's found at Borehole M in the
5 operational area similar to what we see in the northwest
6 corner source area?

7 A No.

8 Q Significantly different?

9 A Yes. There's substantial BTEX in that sample.

10 Q Oh, at MW-104.

11 A If I could consult my spreadsheet to refresh my memory?

12 Q Certainly.

13 A No, MW-104 also has BTEX as well as biodegradation
14 products.

15 MR. LYNCH: Could we please go to Figure 7 of the
16 record of decision? I believe it's 3059, page 121.

17 DOCUMENT TECHNICIAN: (Complied with request.)

18 BY MR. LYNCH:

19 Q This, again, is the figure from the EPA depicting various
20 source areas on the site; isn't that correct?

21 A That's correct.

22 Q And it's true that the source areas identified in green
23 on this diagram are identified as source areas because they
24 contain contaminated soil, correct?

25 A Not just contaminated soil, I don't believe. It's based

1 on the three criteria that they define in the RI addendum.

2 MR. LYNCH: Let's look at the legend of the diagram,
3 please.

4 DOCUMENT TECHNICIAN: (Complied with request.)

5 BY MR. LYNCH:

6 Q The green areas, which -- that you just identified as the
7 source areas, are labeled as estimated extent of source area
8 saturated zone soil and estimated extent of contaminated
9 vadose zone soil above remediation goals.

10 A Correct.

11 Q And the reason EPA is concerned with the places where
12 contamination is found in soil is because soil samples are the
13 most pertinent samples for characterizing a DNAPL source area,
14 correct?

15 A No, no. I think you've misinterpreted the legend. Those
16 three indicators are used to indicate where DNAPL is present,
17 where DNAPL would contaminate soil. So they use the three
18 indicators to draw those zones, those, you know, green blobs,
19 but those are based on these indicators which give the
20 indication that there's DNAPL in the soils.

21 Q Would you agree that soil samples are the most pertinent
22 for characterizing a DNAPL source area?

23 A No, I wouldn't. I think you have to consider the
24 totality of the data.

25 Q Are soil samples the most pertinent sample for finding,

1 for determining the location of the release that caused the
2 contamination?

3 A Well, they're probably the most unequivocal, but I don't
4 know that they're the most pertinent. It depends on what data
5 you have available, and, you know, some of these are clearly
6 not drawn from soil samples, in my opinion.

7 MR. LYNCH: May I approach, Your Honor?

8 THE COURT: Yes.

9 BY MR. LYNCH:

10 Q (Hanging.) You filed a report in connection with this
11 matter, didn't you --

12 A I did.

13 Q -- Dr. Shanahan?

14 On page 17 of your report, talking about contamination at
15 the site, you state, "Soil samples are the most pertinent
16 inasmuch as flowing groundwater can bring high concentrations
17 from upstream locations and do not necessarily reflect local
18 origin." Did I read that correctly?

19 A I am not finding it. Where is it?

20 Q Top of page 17.

21 A I did say that.

22 Q Now the sample you're relying on primarily at MP-105 is
23 the groundwater sample, correct?

24 A That's correct.

25 Q That was a groundwater sample found deep in the ground,

1 just above bedrock, correct?

2 A That's right.

3 Q Okay. And according to your own words, that could
4 indicate concentrations of perc coming from an upstream
5 location and does not necessarily reflect local origin,
6 correct?

7 A That could, yes. But I do want to add one caveat to
8 that, is we've talked about these three criteria that are in
9 the RI. When you actually look at the EPA guidance
10 documentation, they have other criteria which are indicative
11 of DNAPL presence, and one of them is the pattern vertically,
12 and so the fact that you see a high hit down on the bedrock
13 surface is one of the things that the EPA indicates is, you
14 know, is an indicator of DNAPL. So what you're seeing with
15 that high concentration right on the bedrock surface is the
16 likelihood that perc DNAPL -- and again, this is strongly
17 contaminated by perc -- that perc DNAPL is sitting somewhere
18 on the bedrock surface not far from that site, that sampling
19 location.

20 Q And perc can flow along the surface of the bedrock,
21 correct?

22 A Yes, yes.

23 Q DNAPL perc. So it could have flowed from upstream?

24 A Well, it wouldn't necessarily flow from upstream. You've
25 got something that's heavy flowing on a surface, and so what

1 it's going to do is flow from uphill on the bedrock.

2 Q "Uphill" is fine.

3 Now even though you, in your own report, say soil samples
4 are the most pertinent samples, I don't know that you
5 discussed a single soil sample in your entire direct
6 examination.

7 Can you put up -- what was your demonstrative chart? I
8 believe 274, their demonstrative.

9 (Discussion off the record at counsel table.)

10 MS. ENERSON: 279.

11 MR. LYNCH: 279.

12 MS. ENERSON: Page 7.

13 MR. LYNCH: 279, page 7.

14 DOCUMENT TECHNICIAN: (Complied with request.)

15 THE COURT: Let's stop here and take another quick
16 break.

17 THE LAW CLERK: All rise.

18 (Recess taken from 10:50:54 to 11:03:25.)

19 (Open court.)

20 (Jury present.)

21 THE COURT: Please be seated.

22 BY MR. LYNCH:

23 Q Dr. Shanahan, we're again looking at your
24 Demonstrative 279. I believe on direct you indicated that --
25 well, just looking at the ratios here, you've made MP-105 look

1 just like PT-2 and PT-6, correct?

2 A That's what it looks like, yes.

3 Q Your demonstrative, you indicated, doesn't have
4 information on overall concentrations, does it?

5 A Excuse me?

6 Q Your demonstrative does not have information on overall
7 concentrations, does it?

8 A No, they're not scaled to concentration.

9 Q But that evidence is in the record? It's in the
10 documents you have before you, isn't it?

11 A Oh, yes, yes.

12 Q Isn't it a fact that if you actually look at the
13 concentrations, the perc found in the groundwater at MP-105,
14 prior to just, prior to just wells drilled prior to 2003,
15 which is the limit you put on this, is 24 times less than what
16 was found at PT-2 and over 40 times less than what was found
17 at PT-6, the highest concentrations in both those samples?

18 Exhibit 3191, Dr. Shanahan.

19 A What's Exhibit 3191?

20 Q The ATC report that records PT-2 and PT-6.

21 A Yes. I don't know about the exact ratios that you just
22 said, but those have considerably -- PT-2 and PT-6 have much
23 higher concentrations of perc, but, nonetheless, the
24 concentration of perc that you see at MP-105 is above that
25 threshold that's indicative of the presence of DNAPL, and, as

1 I said, the other indicator of DNAPL being present is --

2 MR. LYNCH: Your Honor, we'd ask that the witness be
3 directed to just answer the question.

4 THE WITNESS: -- its orientation in the vertical.

5 THE COURT: Pardon?

6 MR. LYNCH: We'd ask that the witness just answer
7 the question without the narrative.

8 MR. GROSSBART: He's correctly answering the
9 question.

10 THE COURT: No, I thought he answered. But I have
11 to -- I have to follow this procedure I learned in order to
12 get hooked back up.

13 (Discussion off the record.)

14 THE COURT: Yeah, I'll sustain the objection. He
15 asked about the ATC report that records PT-2 and PT-6.

16 Go ahead and start again.

17 MR. LYNCH: Thank you, Your Honor.

18 BY MR. LYNCH:

19 Q Dr. Shanahan, isn't it true that perc released at the
20 surface soils, as it tends to go through the vadose zone and
21 then into the saturated zone, will tend to leave a residual
22 trail of DNAPL as it goes down vertically?

23 A That's correct.

24 Q And soil samples, I believe you indicated, are the most
25 pertinent samples to examine when looking for an origin. You

1 read that in your record just a few minutes ago, correct?

2 A (No response.)

3 Q MP-105, do you recall what the soil sample reading was?

4 A I don't recall, I don't recall the specific number, but I
5 know that there was a soil sample taken at MP-105.

6 Q I can tell you it was .17J.

7 A Yes, but if we were to put up the MP log for that well,
8 what you'll see is the soil sample was taken -- they basically
9 missed the hit. As you go down the log, you get a spike at
10 the original land surface, and then, I don't know, I think it
11 was about 2 feet down below that is where they took the soil
12 sample after the ECD log had come back down. So they missed,
13 they missed the hot spot, if you like, and they did not take a
14 soil sample down at the lower part where they again found high
15 concentrations.

16 Q They had no MIP hits except for the one at the top and
17 the one at the very bottom, correct?

18 A Yes, and then they took the soil sample where they didn't
19 have an MIP hit.

20 Q The only soil sample we have from MP-105 is 1,000
21 times -- more than 1,000 times less than the site DNAPL
22 indicator used by the government contractors; isn't that
23 correct?

24 A You'd have to show me the actual number. I don't recall
25 the specific number. If we could look at the log, I can see

1 that.

2 MR. LYNCH: Julianne, why don't you pull up -- it
3 will be easier -- Exhibit 3058-0038. It's a page from, I
4 believe it is, the RI addendum. Can you pull out the soil
5 sample information for MP-105? Right where I put the red
6 mark.

7 DOCUMENT TECHNICIAN: (Complied with request.)

8 BY MR. LYNCH:

9 Q And the perc hit on that, Dr. Shanahan, is as I
10 represented, 0.17J, correct?

11 A Yes, but again, I asked to see the log --

12 MR. LYNCH: Your Honor, I'd just ask that the
13 witness answer the question.

14 THE COURT: Well, yeah. Answer the question. He
15 asked about the perc hit.

16 THE WITNESS: Yeah, it is .17J, the J indicating
17 it's an approximate quantification.

18 MR. LYNCH: If you'd go to the same document,
19 Julianne, page 35?

20 DOCUMENT TECHNICIAN: (Complied with request.)

21 BY MR. LYNCH:

22 Q Here, Dr. Shanahan, we see the results of some other soil
23 samples collected at the Dyce site. And SB-10, which I
24 believe is a sample you were discussing earlier in the
25 northwest corner, it's over 7,500 times the perc that was

1 found at MP-105; isn't that correct?

2 A Yes. These numbers are higher, certainly.

3 Q Significantly higher?

4 A Yes.

5 Q Thousands and thousands of times higher, in many
6 instances?

7 A Yes.

8 Q And there's been other tests that have been done in the
9 catch pond, correct, at least one other boring that you and
10 Mr. Grossbart discussed --

11 A That's correct.

12 Q -- MP-129. And you didn't find that conclusive as to
13 whether -- or informative as to whether the catch pond is, in
14 fact, the source of the northwest corner?

15 A No. As I indicated, all they did there was the ECD log,
16 and that one, you know, came up essentially clean. But, of
17 course, we have only those two data points at the catch pond
18 as opposed to the many data points in the northwest corner, so
19 it's much more difficult to understand what's going on at the
20 catch pond with many fewer data.

21 Q Would it assist your conclusion to have more data points
22 in the catch pond area?

23 A I would expect it would be useful to have more data,
24 certainly.

25 Q Okay. And you haven't asked for any more samples to be

1 taken from that area, have you?

2 A I didn't know I could. You know, it's not my site.

3 MR. LYNCH: You can close out of this, Julianne.

4 DOCUMENT TECHNICIAN: (Complied with request.)

5 BY MR. LYNCH:

6 Q There's been another sample that was taken at the catch
7 pond that you referred to, the Kaivos sample, correct, in
8 1985?

9 A Yes.

10 Q And Kaivos found no indication of halocarbons above their
11 detection limit, correct?

12 A That's right.

13 Q Perc is a halocarbon, correct?

14 A That's right.

15 Q So Kaivos found no perc in the catch pond in 1985?

16 A Well, actually you said above the detection limit. I
17 don't even know what the detection limit was. They don't
18 indicate that. So at least, you know, for whatever detection
19 limit they had, they didn't find anything, but when you look
20 at those Kaivos reports, most of the detection limits are
21 pretty high.

22 Q If there was a significant amount of DNAPL perc in the
23 bottom of that catch pond, don't you think it's more likely
24 than not that Kaivos would have detected it in that test?

25 A Depends on where they sampled in the pond, among other

1 things, and also, you know, what was going on at the time.

2 Q But we know they tested both liquids and solids from the
3 bottom of the pond, don't we?

4 A Well, I don't know if they say from the bottom. They say
5 they sampled both liquids and solids.

6 Q And even without knowing the detection limits, you think
7 that if there was DNAPL perc in the catch pond, it's more
8 likely than not that Kaivos would have found it in that test?

9 A No, I don't necessarily think so. I mean, for example,
10 when you look at the later pit records, you see very low
11 concentrations of perc in those pit records. I don't think
12 they would have been detectable -- or, well, I shouldn't say
13 that. I don't know if they would have been detectable in the
14 Kaivos, because I don't know their detection limits, but
15 they're low concentrations, and yet we know from the, from
16 that one borehole in the corner of the containment pit that
17 DNAPL perc came out of that containment pit. So despite
18 seeing very low concentrations in the water phase, we know
19 that there was DNAPL there.

20 Q You had your deposition taken in this case, didn't you,
21 Dr. Shanahan?

22 A I did.

23 Q And you swore to tell the truth?

24 A I did, yes.

25 MR. LYNCH: May I approach, Your Honor?

1 THE COURT: Yeah.

2 BY MR. LYNCH:

3 Q (Hanging.) I'm going to direct your attention to
4 page 168 of your deposition, Dr. Shanahan, and we're
5 discussing the Kaivos sample where they did not detect perc in
6 the catch pond. 168, line 10.

7 Question, "Even without knowing the detection limits, can
8 you form an opinion as to whether it's more likely than not
9 that if these tests, if DNAPL perc were present in the catch
10 pond at the time these tests were taken, that the tests would
11 have detected it?"

12 Answer, "It well could, yes."

13 Question, "More likely than not?"

14 Answer, "I would think so, yes."

15 That was your testimony, wasn't it, Dr. Shanahan?

16 A It was, but it was before I had seen the pit records, and
17 so I would say the information from the pit records and also
18 the boring that ATC had done, you know, I've changed my
19 opinion a bit on this because I've seen that additional data.

20 Q You looked at some aerial photos that you interpreted as
21 having signs of repeated releases from the catch pond,
22 correct?

23 A That's right.

24 Q Yet we know that you've been here all week and seen the
25 documents that have been introduced. We've seen the

1 Continental inspection report from 1982. We know that when
2 they inspected the site, they didn't mention anything about
3 those obvious signs of drainage, did they?

4 A I don't recall. I'm not sure that I've even seen that
5 document.

6 Q You've been here all week, haven't you?

7 A I have.

8 Q We saw records from an EPA and state official inspection
9 of the Dyce site in 1985. Again, no mention of any sign of
10 drainage from the catch pond, was there?

11 A Which document is that?

12 Q The notations regarding the EPA and state official
13 inspection of the site in 1985.

14 A It doesn't ring a bell.

15 Q You've referenced a couple times the ATC samples. You're
16 referring to the samples that were done in, I believe it was,
17 2003 from the concrete containment unit?

18 A I forget the exact date, but, yes, it's the one from the
19 concrete containment area.

20 MR. LYNCH: Julianne, can you please pull up 4811?

21 DOCUMENT TECHNICIAN: (Complied with request.)

22 BY MR. LYNCH:

23 Q Are these the samples you're referring to, Dr. Shanahan?

24 A It's in this document, yes.

25 Q And it's your opinion that the sample -- these samples

1 were taken in 2003, correct?

2 A Correct.

3 Q From a concrete containment, subsequent concrete
4 containment unit that didn't exist in the mid 1970s?

5 A That's right. It was built after that.

6 Q And I believe you said it's your opinion that these
7 samples are the exact same thing we'd expect to see in a
8 release from a catch pond -- in contamination resulting in a
9 release from the catch pond?

10 A Well, yes. In essence, these containment pits replaced
11 the catch pond, so it's, it's the same kind of water. The
12 same kind of wastewater would have been going to these, as I
13 understand it, that went to the catch pond back in the earlier
14 days.

15 MR. LYNCH: Julianne, could you go to the next page,
16 please? Pull up the final paragraph, "Concrete, soil,
17 analytical results, flammable containment areas."

18 DOCUMENT TECHNICIAN: (Complied with request.)

19 BY MR. LYNCH:

20 Q "Constituents detected in either one or both of the
21 concrete samples include ethylbenzene, methylene chloride,
22 PCE, and xylenes. None of the constituent concentrations
23 exceeded the PRGs. The soil sample collected immediately
24 beneath the containment areas exceeded the PRGs for
25 ethylbenzene, PCE, TCE, and total xylenes."

1 Dr. Shanahan, are ethylbenzene and xylenes, at least,
2 BTEX compounds?

3 A Well, yes, they're BTEX.

4 Q And BTEX compounds are virtually absent in the northwest
5 corner, aren't they, Dr. Shanahan?

6 A Yes, they are.

7 MR. LYNCH: Okay. No further questions.

8 THE COURT: Redirect?

9 MR. GROSSBART: Just briefly.

10 REDIRECT EXAMINATION

11 BY MR. GROSSBART:

12 Q You referenced a log for MP-105. Did you want to look at
13 that log to explain an answer about MP-105 or not?

14 A Yeah, we could look at that, yes.

15 Q Do you have it up there?

16 A Yes. It's 3058-0120.

17 Q What did you want to say before Mr. Lynch moved on to his
18 next question about that?

19 Why don't we first put it on the screen. Hang on.

20 DOCUMENT TECHNICIAN: (Complied with request.)

21 BY MR. GROSSBART:

22 Q Is that the document you want to see?

23 THE WITNESS: Neil, can you rotate it 90 degrees?

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 THE WITNESS: Yeah. Okay.

1 BY MR. GROSSBART:

2 Q Tell us what you wanted to say.

3 A Okay. That's good.

4 What you see here is the log from the membrane interface
5 probe, and along here you see 024. That's the depth below
6 ground surface, so this is the log as you go down, and you can
7 see -- this part of the graph, this graph is what they saw in
8 the ECD reading, and so you can see that they go along. It
9 comes up, and they have a spot here where they get a hit.

10 This line -- or that hit occurs. It's a little hard to
11 read, but it says, "Base fly ash." So this is, this is the
12 fly -- you know, above that is the fly ash that was put down
13 on the ground surface to fill the area, and so then when
14 you're below that fly ash, you're most likely at the original
15 soil. And you can see they've got that little -- they got a
16 hit right there, right at the original soil level, and then
17 this, these are the written-in analyses for the soil sample
18 that was taken, and this little symbol right here -- I kind of
19 made a mess of that, but you can see that right there --
20 that's where they took the soil sample. So they basically had
21 the hit, and after it went back down to really no hit at all
22 in this area on the ECD log, that's when they took the soil
23 samples. So they didn't really -- you know, they missed their
24 chance, if you like, to get the contaminated soil on that
25 particular, that particular sample.

1 MR. GROSSBART: All right. Let's take that off.

2 DOCUMENT TECHNICIAN: (Complied with request.)

3 BY MR. GROSSBART:

4 Q You were asked some questions about, I think, DNAPL going
5 downhill or coming from upstream or something to that effect.

6 The DNAPL found at MP-105 is either close to or on top of
7 the bedrock at that location, is it not?

8 A Yes. It's basically right at the bedrock.

9 Q All right. And there are -- and you've seen, in the
10 data, contouring that's been done of the bedrock.

11 And I want you to put up, Neil, please, 614, page 6.

12 DOCUMENT TECHNICIAN: (Complied with request.)

13 BY MR. GROSSBART:

14 Q Is it fair to say that from basically this location out
15 towards the river, the bedrock slopes downward?

16 A Well, it actually -- there's almost kind of a valley
17 structure, so this area is generally lower. It does slope
18 that way, but you also get a component that's kind of sloping
19 this way --

20 Q All right.

21 A -- into that valley.

22 Q Have you seen anything in the data that would explain how
23 the DNAPL here, if it really had been sliding down the
24 bedrock -- well, let me just ask it this way. How did the
25 DNAPL, if it was coming from upstream, know how to stop under

1 the catch pond? Or --

2 A Well --

3 Q It doesn't know, does it?

4 A Well, more than that, I also looked uphill. There's
5 other wells uphill, and they look very, very different than
6 what you see at MP-105. They don't have that signature with
7 the strong perc concentration.

8 MR. GROSSBART: Nothing further. Thank you.

9 THE COURT: You can step down.

10 Call your next witness.

11 MR. JOHNSON: Your Honor, at this point we'd like to
12 play the deposition of Richard Brill, which will take us
13 clearly to lunch, maybe a little bit after, as well.

14 THE COURT: All right.

15 MR. JOHNSON: This is the deposition of Richard
16 Brill that was taken on February 12, 2003.

17 THE COURT: Let me have a sidebar.

18 (Discussion on the record at sidebar.)

19 THE COURT: Here is a note that Cheri wrote:

20 "Judge, the jury was confused yesterday during the reading of
21 the deposition right after lunch. Apparently there was a
22 change in the person testifying, or so they thought, yet the
23 reader remained the same." Then it says, "This must have
24 occurred when Amanda was in here because I don't remember it.
25 If there are any further depositions read, they would like to

1 request that they be notified when the testimony changes or
2 have the reader change."

3 MR. GROSSBART: It was obviously one deposition with
4 one reader split by the lunch hour.

5 THE COURT: Yeah. I think what -- they want to know
6 when there's a question being asked by somebody else, I think,
7 if it's cross or direct, so --

8 MR. GROSSBART: Well, I don't know. The depositions
9 are read consecutively as they follow the deposition. I'm not
10 sure I follow what you're saying.

11 THE COURT: What I, what I can do -- you know, I
12 explained this to them at the start. I can reemphasize it,
13 that these lawyers, you guys went around the country taking
14 depositions. Whoever was taking it would ask questions first.
15 Then other people who were there got to ask questions in
16 followup.

17 MR. GROSSBART: Right, and I think they should
18 disregard -- they should not draw an inference because a
19 lawyer for one party is asking a question as opposed to
20 another lawyer from another party. They should take nothing
21 from that.

22 MR. LYNCH: And I don't believe we have any more to
23 be read.

24 THE COURT: Was it the one after, was it the one
25 after lunch that you guys were reading?

1 MR. MICKELSON: Yeah. Yes.

2 MR. GROSSBART: We started before and finished up
3 after lunch.

4 MR. COZZENS: It might not hurt to remind them again
5 that everything both sides want to be read is being read at
6 one time.

7 THE COURT: Yeah.

8 (Open court.)

9 (Jury present.)

10 THE COURT: Ladies and gentlemen, the reason I had a
11 sidebar is this. Cheri gave me a note that you were confused
12 yesterday after the reading of the deposition right after
13 lunch. As I told you at the beginning of the trial,
14 depositions are to be considered as though the person was
15 sitting here testifying. Most likely my insistence -- or the
16 depositions that are either read or played to you on
17 videotape, on the videotape you can hear a change in the voice
18 of people who are asking questions.

19 Lawyers, the lawyers in this case, for a significant
20 period of time, traveled around and took depositions. And
21 those depositions, one party, whoever requested the
22 deposition, they're the ones first asking the questions.
23 Other lawyers that are there, then, have an opportunity and a
24 right to ask their own questions. You shouldn't put any
25 significance on the fact of who is taking the deposition or

1 really who is asking the questions. Listen to the questions,
2 the answers. That's the testimony of the witness.

3 Now the next deposition, I think it's the last one,
4 isn't it?

5 MR. JOHNSON: We have a very short one after this
6 one, Your Honor.

7 THE COURT: Is it video?

8 MR. JOHNSON: This is the last long one.

9 THE COURT: Is it video?

10 MR. JOHNSON: Yes. Both of the two remaining ones
11 are video.

12 THE COURT: We're not going to have any more read,
13 but it's just as though the witness was sitting here
14 testifying in the courtroom, and what happened is each side
15 had an opportunity to make objections to questions in the
16 deposition. I've ruled on them before they played them, and
17 if I sustained them, they took it out. They're not, in some
18 cases, playing the entire deposition. They both have gone in,
19 both sides, Soco and the insurers, have gone in, selected
20 portions of the depositions that they wanted the jury to hear
21 and that I ruled was relevant, and the insurers did the same
22 thing.

23 Go ahead.

24 WHEREUPON,

25 ///

1 MR. RICHARD BRILL,
2 called for examination through deposition by counsel for
3 plaintiffs, after having been previously sworn to testify the
4 truth, the whole truth, and nothing but the truth, testified
5 as follows:

6 EXAMINATION

7 Q (By counsel for *Weiss* plaintiffs) "Could you please
8 state your name for the record?

9 A "My name is Richard Brill."

10 Q "Okay. Do you understand that your sworn testimony may
11 be used at the trial of this case?

12 A "I do."

13 Q "Where do you live?

14 A "In Worland, Wyoming. I live at 608 Grace Avenue."

15 Q "And you previously worked at Dyce Chemical in Lockwood,
16 Montana, correct?

17 A "That's correct."

18 Q "When did you begin work at Dyce Chemical?

19 A "1988, approximately. I'm not sure of those, absolutely
20 positive of those dates, what date or what month or anything
21 like that.

22 Q "Do you know when it was that you left employment with
23 Dyce Chemical?

24 A "Early '94."

25 Q "Well, we really appreciate your going out of your way to

1 be here.

2 "Is it fair to say that your work at Dyce Chemical was
3 really the only time that you've worked in the chemical
4 industry?

5 A "Yes.

6 Q "Okay. I would like for you to tell me, if you could,
7 beginning in 1987 or '88, when you first came to Dyce, kind of
8 what the progression of your jobs for that company were.

9 A "Okay. In the beginning, when I started work for Dyce, I
10 was a yard hand, and we done loading and unloading trucks. We
11 filled drums from bulk tanks. We took care of the warehouse
12 and tank farm, and we cleaned the sediment out of the tanks --
13 the collection pits, actually, not tanks but collection pits,
14 and just worked around the yard.

15 Q "And that's the job you did when you first started there
16 at Dyce?

17 A "Yes.

18 Q "And did you move to some other job?

19 A "Yes, I did. I moved -- I was there for a year and a
20 half or two, and then one of the foremens left, so I took the
21 foreman's job. And then after the foreman's job, they moved
22 me to delivery truck driver.

23 Q "Can you tell me when it was that you took over as
24 warehouse foreman?

25 A "I don't remember the dates. No, I can't tell you. I

1 don't remember exactly when that was.

2 Q "Can you tell me about how long it was after you started?

3 A "About two years, approximately.

4 Q "So about probably 1989 or '90?

5 A "Approximately, yes.

6 Q "What were your duties as warehouse foreman?

7 A "To make sure that the operation run smoothly, that we
8 got the tank cars unloaded, that the delivery trucks were
9 loaded, that the product that we needed delivered, you know,
10 in town. We had three refineries to deliver to in the local
11 area. Then we had just in-town deliveries for the local
12 people, and then we had bulk product that we drummed into
13 55-gallon drums for distribution.

14 Q "As warehouse foreman, did you have any role in training
15 employees?

16 A "Very little. Most of the employees that we had were
17 there. I mean, there wasn't a big turnover in employment.
18 So, no, really everybody was pretty well trained, so I didn't
19 have -- actually it was quite the reverse. Most of those guys
20 trained me, you know, and that's pretty much how that worked."

21 Q "Were you being trained by the employees that you
22 supervised while you were warehouse manager?

23 A "Yes. It was not -- it was -- we all worked together. I
24 mean, there wasn't a lot of, you know, separation between the
25 warehouse foremen and the other guys that worked in the yard.

1 When I say they trained me, it's because they knew as much
2 about the operation as I did, and the guys that just made sure
3 that everything got done and followed up to make sure that
4 that was done and that, you know, the little paperwork that we
5 done, they had to make sure that it got in and those kinds of
6 things, you know. Scheduling drivers and make sure that the
7 workers were at work and make sure that everybody was working.

8 Q "Did you ever -- first of all, how long were you a
9 warehouse foreman?

10 A "Oh, not very long. About a year and a half.

11 Q "During that time, did you have any new employees come
12 into the warehouse?

13 A "Yes. There was a couple younger fellows came in.

14 Q "Do you recall their names?

15 A "A guy by the name of Dan. I don't remember his last
16 name.

17 "Greg Guelff started after --

18 THE REPORTER: "Greg Wells?

19 THE WITNESS: "Guelff.

20 THE REPORTER: "Guelff?

21 THE WITNESS: "Guelff. I'm not sure how to spell
22 it. G-u-e-l-f, I think. Something like that.

23 Q (By counsel for *Weiss* plaintiffs) "And do you recall
24 that his name was Craig Guelff?

25 A "Yes.

1 Q "Okay. Did you get to know Mr. Guelff while you were
2 supervising him?

3 A "Yes, I did.

4 Q "Did he strike you as an honest, trustworthy employee?

5 A "Yes."

6 Q "Do you recall ever getting any specific training from
7 Dyce, yourself, when you started as a warehouseman, about
8 preventing spills into the environment?

9 A "Yes, and it was ongoing. Dyce provided training. They
10 showed us some safety films continuously. We attended all of
11 Burlington Northern's safety seminars, and whenever Conoco or
12 Exxon Refinery had safety meetings and so forth, usually
13 annually or sometimes even more often, we attended a lot of
14 those. It was a safety process because we dealt with some
15 serious chemicals, and there was times when the local fire
16 department came out, and they brought breathing apparatuses
17 and retrieval tanks and air tanks and so forth and showed us
18 how to use those. I think their safety training was ongoing
19 continuously."

20 Q "It sounds to me like you're describing a fair bit of
21 training about personal safety, how not to get hurt while
22 handling these chemicals.

23 A "Yeah, and what to do if you have a spill or if there's a
24 spill or how to handle it."

25 Q "We're going to talk a fair bit about chlorinated

1 solvents here today, and when I say 'chlorinated solvents,'
2 what I mean is perchloroethylene and trichloroethylene. Do
3 you recall handling those chemicals when you were at Dyce?

4 A "Yes.

5 Q "Do you ever recall getting any instruction from your
6 managers at Dyce about the dangers to the environment if those
7 were spilled outside containment?

8 A "The training that we had on those, we watched several
9 films, and it was -- I think they were made available by the
10 supplier, and we -- I'm trying to think how extensive that
11 training was. But we knew that, and in comparison to the
12 other chemicals that we used there, these were -- you know, we
13 didn't use them that much. I mean, very seldom did we have
14 that much to do with them, because we supplied local cleaners
15 with perc, and we did drum it, and it was always, it was
16 always diluted and washed to the holding tanks just behind the
17 tank farm. You know, it was diluted with water and washed
18 down. It was --

19 Q "What was diluted?

20 A "The trichlor or the chlorinated solvents were always
21 diluted with water and washed to the drain, and then they were
22 contained in the pits behind the tank farm.

23 Q "You mean when they were spilled during drumming?

24 A "Yes.

25 Q "Was that pretty common, to have small spills there?

1 A "No, it wasn't. Very seldom did we have any. There was
2 a tank that we delivered from the -- on the back of the truck,
3 and there was a -- then we pulled it out of a tank and put it
4 in 55-gallon drums, and seldom was there, you know, outside of
5 what was in the nozzles, which is a cup or half cup, you know.
6 Once in a while when we'd take some of it out of town, there
7 would be some in a hose that would drain on the ground, on the
8 asphalt where we would wash it, or cement. We would wash it
9 to the drain, and it would go back to the tank farm.

10 Q "So Dyce had a policy of cleaning out those spills
11 immediately; is that right?

12 A "Yes, exactly.

13 Q "And what you were telling me was that the way that those
14 spills were cleaned up was to hose the concrete off --

15 A "Yes, that's correct.

16 Q "-- with water?

17 A "Right.

18 Q "Okay. Tell me again where that water went once they
19 were hosed off.

20 A "It went to the drain, and it went to the holding tanks
21 that were right behind the, right behind the tank farm.
22 There's two big ponds right behind the tank farm, you know,
23 for that purpose, you know. Anything that we spilled or run
24 off went to them.

25 Q "Did you almost always have a little bit drip onto the

1 concrete when you were drumming, say that half cup out of the
2 nozzle?

3 A "Pretty regularly, yes.

4 Q "Do you ever recall anyone at Dyce Chemical telling you
5 what the environmental dangers of a chlorinated solvent spill
6 were?

7 A "Yes. They were part of the training we got from the
8 supplier, like I said, and we played -- those things were
9 reintroduced every year as part of a safety program, and I
10 think that every year that I was there we went through
11 training and how to be as cautious as we could not to spill it
12 and to carry drip pans and those kinds of things so we got as
13 little as possible onto the ground."

14 Q "I'm going to hand you a document marked Exhibit 232 and
15 ask you to take a look at that. I'll represent to you that's
16 an aerial photograph of Dyce Chemical taken about 1987 --

17 A "Okay.

18 Q "-- which was about the time that you started work there,
19 correct?

20 A "That's correct.

21 Q "Do you recognize that as Dyce Chemical?

22 A "Yes, I do.

23 Q "Okay. I'm also going to hand you a pen. I would like
24 for you to make some markings on this exhibit for me, if you
25 would. The first thing I would like for you to mark is the

1 area where you were explaining there were catch basins behind
2 the tank farm.

3 A "Okay. The tank farm is right here, and right here
4 there's -- I can just encircle that.

5 Q "That would be great.

6 A "Right here.

7 Q "Could you please draw lines off of those, maybe to the
8 top of that pole barn or something, where you can label that
9 with a number 1?

10 A "Okay.

11 Q "Great. So the three kind of long oval circles next to
12 one another on this Exhibit 232 are the catch basins on the
13 back side of the tank farm?

14 A "That's correct.

15 Q "And that's what you were describing for me? That's the
16 place that Dyce used to contain the small, routine spills from
17 drumming and such?

18 A "That's correct.

19 Q "Okay. Can you tell me where the drain is that you
20 described a moment ago about where those spills would be
21 washed into?

22 A "Okay. Right here in front of it is a, a drumming shed.
23 Right there. And it had, it had a drain in it. I'm trying to
24 recall how that . . .

25 "I remember how that drain went, but it was -- it ran, it

1 ran back, back to these, back to these tanks.

2 Q "Okay. Can you label the drumming shed for me as well
3 with a number 2? Why don't you, why don't you draw that line
4 over to the top of the pole barn, if you would, so that we
5 know that it will photocopy well.

6 A "(Complied with request.)

7 Q "Great. Okay. And that what you labeled as No. 2 on
8 Exhibit 232 is where the drumming shed was?

9 A "That's correct.

10 Q "And it's your testimony that there was a drain that ran
11 from the drumming shed or right near the drumming shed to the
12 catch basins?

13 A "Yes, that's correct.

14 Q "Okay. What did you call those catch basins?

15 A "They were just the collection pits or ponds.

16 Q "Okay.

17 THE REPORTER: "Or ponds?

18 THE WITNESS: "Or ponds.

19 THE REPORTER: "Thank you.

20 Q (By counsel for *Weiss* plaintiffs) "Do you recall seeing
21 those collection pits built?

22 A "No. They were built when I started.

23 Q "Okay. Do you remember any other ponds at the facility
24 when you started there?

25 A "Yes. The two large ones that are toward the back of the

1 lot were built after I got there.

2 Q "Okay. Were there any other ponds that you can recall
3 when you were there?

4 A "No. That's all.

5 Q "Do you recall any pond down in this area, down at the
6 end of the railroad spur?

7 A "When I first started there, that was kind of a, kind of
8 a desolate, no man's land, and then they, they filled it in,
9 and it was -- later on, they just graded it and filled it in
10 preparation for those ponds. I don't recall exactly how that
11 all come about. They, they filled that in and made it usable,
12 because there was, there was nothing back there. It was just
13 an extra lot, and I don't recall them ever using it for
14 anything.

15 Q "You said it was kind of desolate. What's your
16 recollection about the way that looked?

17 A "It was real rough ground. It was unkempt. And at one
18 point we went back and picked up all the debris and broken
19 pallets and things like that, and then they hauled, I think
20 they hauled some dirt in and gravel and leveled it all off in
21 preparation for building the ponds that they built."

22 Q "I want to talk with you about some of the ways that you
23 and the other Dyce employees moved chlorinated solvents there
24 at the facility when you worked there, and let's go ahead and
25 start with when chemicals were brought in. Did chlorinated

1 solvents usually come in on a truck?

2 A "Yes. They came in in a tank truck.

3 Q "And how did you move, how did you move those solvents
4 off the truck?

5 A "They were hose and pump. We hooked up usually a 2-inch
6 hose and pumped them off into a designated tank.

7 Q "An above-ground storage tank?

8 A "Above-ground storage tank, that's correct.

9 Q "Did Dyce have the same policy for immediately cleaning
10 up any spills that occurred during that process?

11 A "Yes.

12 Q "And how did you do that?

13 A "Basically they were, the trucks were unloaded right in
14 front of the drumming shed.

15 Q "Can I have you circle that area for me as well?

16 A "The trucks were parked right here in front of that
17 drumming shed. Right in here.

18 Q "Can you draw a line off of that to somewhere where it's
19 light-colored so we can -- and label that with a 3?

20 A "A 3?

21 Q "Yeah. So No. 3 on Exhibit 232 is the area that you're
22 describing chlorinated solvents were unloaded off of trucks?

23 A "That's correct.

24 Q "Okay. And you were describing the clean-up process for
25 spills during that process?

1 A "Right there when they parked was, was all cement, and
2 then it was, it was washed down to the drain, and then the
3 drain ran back to the, to the settling tanks or the pits right
4 behind the tank farm.

5 Q "Okay. What quantity of chlorinated solvent was commonly
6 spilled during that process?

7 A "Very little, because they were, they were -- they kept
8 pretty close tabs on us, because they were aware. I think
9 that maybe a little residue out of the hose, you know, which
10 would be a 15- or 20-foot, 2-inch hose that ran from the truck
11 to the pump, you know, or to the tank. And that was
12 probably -- you know, I have no idea how much was in there.

13 Q "Are we talking about a relatively small amount, say less
14 than a gallon?

15 A "Approximately, yes. There wouldn't be any more than
16 that, because we always had to drain it into the pump, and the
17 pump would pump it into the tank, so, yeah, that much.
18 Seldom, if ever, more than that.

19 Q "Do you think you ever saw more than a gallon spilled
20 during that process?

21 A "I'm trying to think of an incident where we might have.
22 No, I don't recall. Like I say, whatever was -- you know,
23 when you disconnected the hose from the pump, there was a
24 little there, but, see, there was drip pans, and we had the
25 drip pans, and we collected the drip.

1 Q "Was it common to have, say, as much as half a gallon in
2 that hose, in that area?

3 A "Approximately. Between a half and a gallon. You know,
4 it was somewhere in there.

5 Q "Okay. How, how much of that -- and is that, is that --
6 was that an average? I mean, that's basically what you would
7 say?

8 A "Probably an overall average. That would be a good, a
9 good estimate, yes.

10 Q "Okay. So it's your testimony that, that you would, you
11 would see about a half-gallon to a gallon escape when you
12 unloaded a truck?

13 A "Yes, sir.

14 Q "Okay. How much of that actually got cleaned up and
15 taken back to the collection pits?

16 A "We had to clean it all up because there was another
17 product that would follow it, so it had to be, it had to be
18 cleaned up real well, because it was -- you know, it would, it
19 would contaminate another product, so we had to be real
20 cautious and not contaminate, or cross-contaminate any of the
21 other products we had.

22 Q "Okay. So are you saying that on average when a truck
23 came in, about half a gallon or a gallon of solvent would be
24 cleaned up and washed back to those collection pits?

25 A "Yes, that's correct.

1 Q "How often did you get trucks of perc during the time
2 that you worked there?

3 A "Perc, okay. Maybe twice a year, roughly. You know,
4 approximately. Maybe three times, but seldom more than that.
5 Depend on, of course, depend on how much we were using, but
6 then, of course, they -- there was something about trichlors
7 were being -- not being used anymore, so they were on, they
8 were on decline. So toward the end of the time I was there,
9 they slowed to very little. You know, I would say a part of a
10 truckload a year, you know, was all.

11 Q "For trichloroethylene --

12 A "For trichloroethylene and perc.

13 Q "Again, we need to be real careful not to talk over each
14 other.

15 "Tell me about -- does that basically summarize what you
16 recall about how chlorinated solvents were taken off of
17 trucks?

18 A "Yes, as far as I recall. And, like I say, it was --
19 there are so many other things that were -- that we used so
20 much more of, you know, that -- I'm trying to think of what
21 would -- what it was that we used. I mean, how often we --
22 when it come in, it was handled right away. We had a pretty
23 good idea how much needed to go into drums. So it came in.
24 We put it in steel drums and then pulled it out of stock as we
25 needed it. So I -- and it happened, like it would come in one

1 day, and the next day we'd put it in drums, and then we'd have
2 the bulk tank for, for distribution of 100 or 200 gallons at a
3 time, or 300 gallons at a time. So, I, you know -- we
4 didn't -- it's not one of the things that I recall moving a
5 bunch of.

6 Q "And that's relative, right? You moved thousands and
7 thousands of pounds or gallons of the acids and solvents and
8 such?

9 A "Right, yeah.

10 Q "Tell me about how you drummed perc.

11 A "Okay. There was a pump in the drumming shed. We would
12 connect the supply line to the pump in the drumming shed, and
13 then there was a filler nozzle. And we done it by hand, each
14 drum individually, and it was on a scale, and when the scale
15 would -- we would fill it until the scale read so many
16 gallons, and then we would shut the nozzle off and moved it to
17 the next drum.

18 Q "And I think you already testified that Dyce had a policy
19 of cleaning spills during that process up immediately as well?

20 A "Yes, that's correct.

21 Q "Can you tell me, on average, what the average spill was
22 from that process?

23 A "Very little from that process. There was one where the
24 most that you would have would be where you disconnected the
25 hose from the pump, you know, the quick couple, and that would

1 be probably the most.

2 Q "What do you mean by that? What kind of volume are you
3 talking about?

4 A "We're talking about, oh, a quart. Maybe a half a
5 gallon, you know.

6 Q "Now was that on average?

7 A "Yeah. And, see, that wasn't each drum. That was per
8 filling of -- you know, when we filled perc drums or trichlor
9 drums, we usually tried to fill like 50 of them or so, so we'd
10 have enough on hand that we wouldn't have to stop and do this
11 whenever an order came. So probably every 60 days, I would
12 say, roughly, we would drum perc or trichlor."

13 Q "And I want you to recall this as carefully as you can,
14 you know, what your best recollection is of the amount that
15 would, on average, spill during a drumming episode of perc.

16 A "Okay. I understand that, and I'm trying to think. With
17 perc, it was in smaller quantities because we didn't --
18 because it was -- that was a cleaning solvent, and that was --
19 it was pretty much the same because there was very little,
20 because of the caution that we, you know, tried to exercise,
21 and I'm speaking for myself and a few guys during the time
22 that, you know, that I worked there.

23 Q "When you say a 'smaller' quantity, do you mean like
24 about a half gallon?

25 A "Yeah, a half gallon, but, I mean, overall amounts of

1 drums of perc and versus drums of trichlor. There just
2 weren't that many of them."

3 Q "Were there times when you moved perc where you, during
4 drumming, where only, say, like a 12-ounce pop can amount was
5 spilled?

6 A "It would be -- you know, if we had -- usually, you know,
7 it varied from each filling, but what I'm saying is that when
8 we, you know, when we filled the bulk tank on the back of the
9 small truck and delivered it in town, or when we filled the
10 drums with -- we would put perc in 5-gallon steel cans, also,
11 and it was a process that seldom ever netted more than, like
12 any more than a half gallon. So pop can amount, you know, if
13 you accumulate what was in the drain pans, it would, you know,
14 overall accumulated amount would still be up to a half
15 gallon."

16 Q "Did you almost always end up hosing off the pavement
17 after you moved perc?

18 A "Yes. Always. If there was a spill, you know, I mean,
19 if there was any residue of any kind, like I said, we had to
20 be real cautious of cross-contamination. So we were real
21 cautious about washing down -- to wash off the truck bed and
22 the equipment. And the reason being is the next guy that came
23 to set up to drum something would have to be cautious of what
24 was used, what was run before him, and it was the procedure to
25 wash down after you got done, you know."

1 THE COURT: Can you stop it?

2 THE WITNESS: "And I would grant you that maybe once
3 in a while, but seldom, if somebody got in a hurry, they would
4 leave it and say --"

5 THE COURT: Go ahead and finish this and then stop
6 it.

7 THE WITNESS: "-- 'Would you, would you clean this
8 up? I've got a delivery to make,' or, 'I've got so much
9 time,' you know. Occasionally that happened. And when I was
10 foreman, that's a lot of what I did, you know. This guy has
11 to go make a delivery, and I would clean up what he had left
12 and make sure we were ready for the next -- you know, that was
13 part of my responsibilities."

14 THE COURT: Ladies and gentlemen, we're taking a
15 noon recess. I give you the usual admonition.

16 We'll be in recess; I'm going to say 1:20.

17 THE LAW CLERK: All rise.

18 (Recess taken from 12:00:45 to 13:24:10.)

19 (Open court.)

20 (Jury present)

21 THE COURT: Please be seated.

22 Go ahead.

23 Q (By counsel for *Weiss* plaintiffs) "And here's why I ask.
24 What I'm really trying to get at is to know, on average, you
25 know, when you moved perc, when you drummed it, for instance,

1 how much got washed down to those catch pits?

2 A "Very little, because we had contaminated product drums
3 that we, you know, would drum that stuff, and then they were
4 sent to, I guess, the distribution or disposal site, whatever
5 that -- I think it was in Utah.

6 Q "Okay. What do you mean by 'very little'?

7 A "Like, you know, whatever we have in the catch pans or
8 that would be dumped into 55-gallon drums that was going to
9 the hazardous waste disposal. And we're talking about the
10 half gallons that we talked about, maximum a gallon. But we
11 put them in those drums, and that stuff would be sent off."

12 Q "And there you're talking about what came out of those
13 catch basins?

14 A "Right.

15 Q "So on average you're saying that a cup or so would get
16 washed down to the catch basins when you moved perc?

17 A "Yes, basically. But sometimes maybe, maybe a quart.
18 Maybe up to a quart. That would be an extreme case.

19 Q "Did you ever -- do you recall the skid that was used to
20 deliver perc to the drycleaners in town?

21 A "Yes.

22 Q "Do you recall that that skid had a long hose on it, on a
23 roll on the back of it?

24 A "On a reel, yes.

25 Q "Do you ever recall any issues with trying to get perc

1 out of that hose back into the skid?

2 A "No, I don't recall anything of that nature.

3 Q "Okay. There's been other testimony in the case that
4 sometimes perc was spilled while trying to walk that hose back
5 to the skid, to drain that hose back into the skid. Do you
6 recall that ever happening?

7 A "I don't recall that being a problem.

8 Q "And did you rinse out the hoses that you used?

9 THE REPORTER: "'Rinse'?

10 COUNSEL FOR WEISS PLAINTIFFS: "Rinse --

11 THE REPORTER: "Okay.

12 Q "-- out the hoses that you used to move chlorinated
13 solvents when you worked at Dyce?

14 A "Yes, we did.

15 Q "Tell me how that process worked.

16 A "That, that was part of the cleanup process at the end of
17 drumming or unloading or loading, and they would, they would
18 be emptied, and then we'd just take the water hose and wash
19 them, wash them out, and we'd put the hoses up on a, on a hose
20 rack.

21 Q "Okay. So if, if you moved perc from a truck to your,
22 your above-ground storage tank, how long is that hose?

23 A "I think I mentioned earlier, 15, maybe 20 feet.

24 Q "Okay. How did you hook the water hose up to that hose
25 to clean it up?

1 A "We put one end in the drain, and we'd hold it, just hold
2 it in our hand. We'd take a spray nozzle and push it into
3 the, into the hose.

4 Q "Did you do that every time that you moved perc?

5 A "Yes.

6 Q "Why?

7 A "To keep the hoses clean. You know, to keep the, to keep
8 from, like I say, cross-contamination. You have to be real
9 careful of that.

10 Q "Okay. You said you put the spray nozzle in one end of
11 that hose?

12 A "Um-hmm.

13 Q "Where did you put the other end of the hose?

14 A "In the drain.

15 Q "Into the drain that drained to the catch basin?

16 A "That's correct.

17 Q "Okay. Do you have a feel for how much perc would be in
18 that hose when you rinsed them out like that?

19 A "As far as liquid, whatever residue hung to the, to the
20 inside of the hose was all that was there, you know, and we
21 just wanted to make sure that it was -- you know, and it was a
22 rubber product or a neoprene product, and it would be like
23 whatever was held against that product, you know, because the
24 liquid had already been dumped. I mean, the liquid that would
25 run, you know, would move, was already gone. You know, we

1 dumped it out.

2 Q "How did you do that?

3 A "We put it in the, in the drip pan, in the catch basin
4 and walked the hose up, walked the hose out.

5 Q "Was that difficult to do alone?

6 A "Oh, sometimes. Usually when it was cold, it was. The
7 hose got pretty stiff.

8 Q "Did you ever, ever have any problem with the hose
9 jumping out of the drip pan and knocking the drip pan over?

10 A "Not knocking it over. Occasionally I'd say it probably
11 jumped out of there.

12 Q "So would you have small spills when that happened?

13 A "I guess.

14 Q "Again, are you talking, when you say 'small,' are you
15 talking less than a gallon?

16 A "Yeah.

17 Q "How often might that happen?

18 A "Every other month, you know, when we drummed, when we
19 drummed perc or trichlor.

20 Q "So once every couple months is what you're saying?

21 A "Yeah.

22 Q "Okay. So you washed the hoses out every time you
23 drummed perc as well as when you moved it off the truck?

24 A "That's correct.

25 Q "Okay. Did you use the same, the same length hose for

1 drumming as you did for moving from the truck?

2 A "Yes, because they were dedicated hoses to trichlors.

3 Q "Do you mean that that hose only got used for chlorinated
4 solvents?

5 A "That's correct.

6 Q "But you still rinsed it out each time?

7 A "Yes."

8 Q "I want to talk with you about the waste and rinsewater
9 that went back to those evaporation pits.

10 A "Okay.

11 Q "Did those pits also collect rainwater that fell at the
12 facility there?

13 A "Yes, that's correct.

14 Q "Did you ever see those pits fill up?

15 A "Yes.

16 Q "Did you ever see those pits emptied?

17 A "Yes. We pumped-- the pits behind the tank farm were
18 pumped to the aeration pond down below."

19 Q "Okay. Now, you said that those aeration ponds were
20 built while you were there; is that correct?

21 A "Yes. That's correct.

22 Q "Where were those pits drained before the aeration ponds
23 were built?

24 A "They pumped it into hazardous waste drums. That was why
25 they built the pond back there, because they had to pump all

1 that in those three pits into hazardous waste, and to take
2 hazardous waste and get it disposed of was terribly expensive.
3 So that's why they built the aeration ponds down below there.

4 Q "Do you know, as we sit here today, whether water from
5 those pits off of the tank farm was ever pumped into the
6 pasture out back of Dyce?

7 A "I don't recall that.

8 Q "Okay. Do you know if -- why don't you go ahead and
9 circle these evaporation pits for me and label those with a 4.

10 A "Okay.

11 Q "Now the pits that you have labeled on Exhibit 232 with
12 the number 4, those are what you're referring to as
13 evaporation pits, correct?

14 A "That's correct.

15 Q "Okay. And you said that those were built just after you
16 started there?

17 A "That's correct.

18 Q "Okay. What would happen when those pits themselves
19 filled up with water?

20 A "They, like I said, they had a sprinkling system that
21 aerated the, took the water, evaporated the water out, and
22 then the residue inside was scooped and put into hazardous
23 waste drums.

24 Q "Did you ever see those pits drained anywhere?

25 A "No, I didn't.

1 Q "All right. Do you know if the water in the pits on the
2 north side of the tank farm was ever tested to see what its
3 chemical composition was?

4 A "Well, we always tested it for pH levels to find out
5 where it was at, and then we would, we would -- always before
6 we pumped it down there, it had to be a neutral before we
7 pumped it down there.

8 Q "Did you ever test it for anything other than pH?

9 A "No, I did not.

10 Q "Would you presume, based on the fact that it also
11 received rinsewater from the, say, the perc hoses and perc
12 spills and things like that, that it probably had some amount
13 of perc in it as well?

14 A "That, that would be a safe assumption, sure."

15 Q "Mr. Brill, I want to talk with you a bit about how
16 returned drums were stored at Dyce Chemical during the time
17 you worked there. Do you recall drums being returned from
18 customers?

19 A "I do.

20 Q "Did most of the drums that went out get returned?

21 A "Yes, because there was a deposit on the drums, and they
22 were -- largely all of them were returned.

23 Q "During the time that you worked at Dyce, where were
24 those returned drums stored?

25 A "I showed on the picture. They were stored down here

1 against the back fence, and there's -- the blue area indicates
2 plastic drums, and the steel drums were along the back fence.

3 Q "Can you circle that area for me and label it on
4 Exhibit 232 with a number 5?

5 A "(Complied with request.)

6 Q "Okay. Now you've circled an area that looks to me to be
7 blue. Is there another area where the steel drums were kept?

8 A "Yes, there are. The blue area -- pardon me -- are the
9 plastic drums. The steel drums are down here against the
10 fence.

11 Q "Okay. Can you label that area on Exhibit 232 with a 6?

12 A "(Complied with request.)

13 Q "I'd like for you to hold that up for the camera, if you
14 could.

15 A "(Complied with request.)

16 Q "Okay. Thank you. I don't think we are going to be able
17 to zoom in quite close enough to pick that up.

18 "Were perc drums returned to Dyce as well?

19 A "Yes, they were.

20 Q "Okay. Who hauled the drums away for Dyce?

21 A "It was a company out of Oregon. Beehive Drum.

22 Q "Do you recall any of the names of the folks that
23 actually -- the drivers that came in to pick drums up?

24 A "It was the same guy all the time. I don't recall his
25 name.

1 Q "Does the name Art ring a bell?

2 A "Yes, it does.

3 Q "Do you happen to recall Art's last name?

4 A "No, I don't.

5 Q "Do you know anything else about Art?

6 A "Art was -- I loaded his truck several times, and he was
7 pretty fussy about making sure the drums were empty before we
8 put them in his truck. That was a big thing, getting loaded
9 as fast as we could, because he had a long trip.

10 Q "What do you mean he was fussy about having empty drums?

11 A "Because he took the drums back, and he washed them all
12 out and reconditioned them and brought them back to us."

13 Q "And where did that happen?

14 A "Right back here in this back area where the drums were
15 located. He would back his truck down here, depending on
16 whether he was getting plastic drums or steel drums, and he
17 would back his truck down here, and we would load him right
18 down there in that area.

19 Q "So that dumping would occur in the areas marked 5 and 6
20 on Exhibit 232?

21 A "That's correct.

22 Q "Okay. How often did that happen?

23 A "Oh, he was there -- I can't tell you how often he was
24 there. Pretty regularly, because we had a lot of drums. The
25 other thing is some of the drums were dumped on the ground.

1 There was also hazardous waste drums that they had that we
2 dumped a lot of product in, also. There was a lot of -- it
3 seemed like they had as many drums with product in them as we
4 did empty --

5 THE REPORTER: "'It seemed' --

6 THE WITNESS: "That we had as many drums with
7 product in them as we did empty ones, because the customers
8 weren't draining their drums completely.

9 Q (By counsel for *Weiss* plaintiffs) "Was that a continuing
10 problem over the time you worked at Dyce, having drums come
11 back with product in them?

12 A "Yes.

13 Q "How much product are you talking about in a drum that
14 would get dumped out?

15 A "It's really hard to estimate. You know, you take the
16 lids off, the bungs out of a drum and tip it up, and a lot of
17 times it would be because they sat their drums upright, and it
18 would rain, and, I mean, the heating and cooling would draw
19 the water in. So some of them was just -- it wasn't all
20 product. I mean, it was not all product. It was a matter
21 of -- when we got empty drums, we laid them on their sides or
22 upside down so they wouldn't, you know, pull any moisture in
23 or condensation or draw any rainwater. But what we dumped out
24 of them wasn't always product. It was just water. So -- and
25 you can get from a cup to a gallon, you know. Sometimes more.

1 Q "When that happens, when you dumped those drums out, do
2 you have any way to know what portion of the liquid in there
3 is product and what portion of it is water?

4 A "Absolutely none. Absolutely none.

5 Q "Who was it that actually dumped the drums? Was it
6 yourself and Art and other folks?

7 A "Yeah. Everybody. I mean, Art would do it, and
8 employees would do it.

9 Q "Did you ever do it personally?

10 A "Yes, I did.

11 Q "Did you ever see any other employees do it?

12 A "Usually when I went back to load, we sent one guy back
13 because Art was there and one other guy was there. So, no,
14 not really, I didn't ever witness anybody else.

15 Q "What portion of the time -- let me just ask you this.
16 How many times do you suppose that happened, that you had
17 liquid to dump out of the drums on the ground there?

18 A "Whenever we loaded Art, so, you know, I have no idea how
19 many times he was there. He was there real regularly.

20 Q "Did that happen over the whole course of the time that
21 you worked at Dyce?

22 A "Yes.

23 Q "So it's your testimony that some of those drums got
24 dumped out onto the ground just about every time that Art
25 came?

1 A "That's correct.

2 Q "Were you concerned that there might be dangerous
3 chemicals in those drums?

4 A "Yes, and the reason that I stated earlier was we
5 considered most of it just accumulated water, and so I'm sure
6 there was some chemical residue in there, but we figured that
7 it was diluted to a point that it was relatively harmless.

8 Q "Let me ask you this. If you have a drum that has a
9 gallon of product in it, a gallon of liquid in it, is there
10 any way for you to know if that is 99 percent product or
11 99 percent water?

12 A "There is no way of knowing without testing it to find
13 out.

14 Q "Do you know of any testing that was ever done prior to
15 dumping those drums out?

16 A "No.

17 Q "Did you ever ask any of your bosses at Dyce, the
18 managers there, 'Hey, should we be dumping this product out on
19 the ground?'

20 A "We talked about it, and, you know, I never really did
21 get a satisfactory answer. 'Just get the truck loaded and
22 move him out,' was kind of, kind of the consensus that we got.

23 Q "Who told you that?

24 A "I'm trying to think of his name. Dave. Dave Warne, I
25 think it was.

1 THE REPORTER: "Dave Warne?

2 THE WITNESS: "Warne, yeah. I think it was Warne.
3 Yeah, Warne, Dave Warne. And it was actually, before that,
4 anyway, they said just do what it took to get that truck
5 loaded. They didn't want him sitting there overnight. They
6 wanted to get him loaded and get him out of there. It was
7 always a hurry-up deal to get him loaded and get him out of
8 there.

9 Q (By counsel for Weiss plaintiffs) "But you specifically
10 remember Dave Warne telling you that?

11 A "Specifically, no. What he said was, 'Just get it done.'
12 You know, that was pretty much it. 'Don't mess around. Just
13 get it done.'

14 Q "But he said that to you after you expressed to him
15 concern about --

16 A "Concern about --

17 THE REPORTER: "After he expressed --

18 Q (By counsel for Weiss plaintiffs) "Go ahead and finish
19 your answer.

20 A "I lost it. He said, his comment was that he was
21 concerned about not wasting Art's time and getting him back on
22 the road. He said like, 'Just get it done and get him out of
23 here.'

24 Q "But Dave's comment was in response to your raising
25 concerns about being concerned about dumping dangerous

1 chemicals?

2 A "Yes."

3 Q "Do you know if those returned drums were dealt with any
4 differently in the years before you worked at Dyce?

5 A "I have no idea.

6 Q "Sure. Do you know if any managers at Dyce Chemical
7 other than Dave Warne were ever talked to about that dumping?

8 A "I think Monte Naff was approached. I mean, because it
9 was an ongoing concern, you know, and I'm sure that Monte Naff
10 was aware of it.

11 Q "Do you ever recall any response from Monte on that
12 issue?

13 A "No, I don't. I know Monte Naff was the manager for a
14 while, but he didn't have much to do with us. I mean, I knew
15 who he was, and that was about the size of it. He didn't
16 avail himself to the working people outside.

17 Q "During the time that you said that you had talked with
18 Dave Warne about it, what was Dave's position with Dyce?

19 A "I'm not sure if he was assistant manager then or
20 production man or something. Production manager, maybe. I'm
21 not sure what he was.

22 Q "Was he one of the bosses?

23 A "One of the bosses, yes. The position name, I'm not sure
24 what it was.

25 Q "Okay. Do you ever recall working with Jim Diede when

1 you were there?

2 A "Yes.

3 Q "Do you know if Jim ever knew about that dumping?

4 A "Yes, he did."

5 Q "So if you had, say, 300 drums to be picked up, did you
6 sometimes find yourself having to empty out onto the ground
7 150 of those drums?

8 A "I don't think it was that many. Maybe a third of it,
9 but not a half.

10 Q "So maybe a hundred?

11 A "Possibly.

12 Q "You said -- you made some comments earlier that made it
13 sound to me like you had raised your concerns about that
14 dumping with the management more than once.

15 A "That's correct, yes.

16 Q "How many times did you personally have discussions with
17 management about, 'Hey, should we be doing this?'

18 A "Probably three times. Three or four times, roughly.

19 Q "Was that during the time that you were warehouse
20 foreman?

21 A "Yes, it was.

22 Q "Did you ever have that discussion with them before you
23 became warehouse foreman?

24 A "I talked to Gary Cornwell about it, who was the foreman
25 when I started, and he said he'd take care of it.

1 Q "Did he ever take care of it?

2 A "It didn't ever change."

3 Q "During the time that you worked at Dyce, did Dyce sell
4 almost -- well, did it sell all of the chemicals that it had
5 on site in drums?

6 A "Nearly all of it, yes."

7 Q "Did it sell xylene in drums?

8 A "Yes."

9 Q "Do you recall if it sold toluene in drums?

10 A "Yes, it did."

11 Q "Did it sell perc and trichloroethylene in drums?

12 A "Yes."

13 Q "And did those drums come back to Dyce Chemical?

14 A "Yes, they did."

15 Q "Do you have any knowledge whatsoever of any above-ground
16 storage tank ever leaking chlorinated solvent?

17 A "No, I don't recall."

18 Q "I want to talk with you real briefly about spill
19 reporting policies at Dyce Chemical when you worked there. We
20 talked earlier about the kinds of small routine spills that
21 would happen when you were moving chemical. Was there a
22 policy for reporting spills to managers when they occurred?

23 A "Yes."

24 Q "What was that policy?

25 A "Reportable quantities, according to the hazmat controls,

1 anything that was a gallon or two. Less than that was an
2 unreportable quantity so we didn't say too much about it. If
3 we spilled larger quantities, five, ten, we dropped a
4 55-gallon drum of something and it spilled, we -- it had to be
5 reported.

6 Q "So if you just spilled a gallon of perc, for instance,
7 that wasn't something that you had to go tell a manager about?

8 A "No, it wasn't."

9 Q "So you didn't report some of the things we were talking
10 about earlier? If you spilled, for instance, a quart of perc
11 disconnecting from a tank or something like that, that didn't
12 have to be reported; is that correct?

13 A "No, that's correct.

14 Q "That just got cleaned up?

15 A "Yes, cleaned up and washed.

16 Q "Who taught you about what kind of spills had to be
17 reported?

18 A "Safety training. Part of the training program that we
19 learned while we were there. In the beginning, they, when I
20 very first started, they said, 'If you get something on the
21 ground, tell somebody,' you know, and then they would help
22 determine whether it was a reportable quantity or not. That's
23 what we did."

24 Q "Did you ever play a role in helping maintain inventory
25 when you worked at Dyce?

1 A "No, not other than, than counting and reporting what
2 was, what was there.

3 Q "Okay. That's what I mean.

4 A "We took inventory.

5 Q "Did you ever have times when -- and let's talk about
6 chlorinated solvents here -- when there was a discrepancy
7 between what the folks in the office thought you had and what
8 your inventory showed you actually had?

9 A "See, we didn't know that. We, we, we, we told them what
10 we had outside, and we didn't know what, what the, what the
11 total was inside. We didn't know that.

12 Q "Did you ever have somebody from the office ask you to go
13 find out how much perc there was, for instance, and come back
14 in and say, 'This is how much perc we have,' and have someone
15 say, 'Nah, that can't be right. Go measure again'?

16 A "Yes. We, we checked inventory, and I'm, I'm not sure
17 where, where we -- but we usually found it in -- when we put
18 it in drums. Somebody would neglect to say that they had
19 taken it out of bulk storage and put it in drums, and they,
20 they didn't make a record of it, and that was usually where
21 the difference was. Because they, they would check the amount
22 of perc in the, in the bulk tank and then, then go from there,
23 you know. And then they would try to account for where
24 everything was at.

25 Q "So how much of a difference could there be when that

1 sort of thing happened?

2 A "Oh, gosh. We would fill, like I say, maybe 30 drums, 30
3 to 50 drums. So that would be 55 gallons per, and we'd take
4 that out of the, out of the storage tank. So it could be, it
5 could be, it could be that far off.

6 Q "How many gallons would that be?

7 A "1,500 to -- or approximately. Give or take.

8 Q "So given -- and you're saying that that, that actually
9 occurred?

10 A "That actually occurred, but we accounted for it. See,
11 we went and found it. The drumming had taken place, and we
12 accounted for it.

13 Q "Do you recall discrepancies in the perc inventory more
14 than once?

15 A "Several times. Yeah, more than once, but I don't --
16 like I say, we always went and accounted for where it was at.
17 It was just recordkeeping, which was part of my responsibility
18 as warehouse foreman, to make sure that things worked out, and
19 somewhere between the fellow that filled the drums and the
20 5-gallon containers and the office, we'd lost track of it.

21 Q "During the time that you worked at Dyce, do you think
22 that if there was, say, a 40-gallon discrepancy in the perc
23 inventory between what you actually had and what the office
24 thought you had, would that small of a discrepancy have been
25 something that would have been cause for alarm?

1 A "Yes, it would. We needed to find it.

2 Q "How small a discrepancy would not be an issue?

3 A "I don't know. You know, that wouldn't be my call. If
4 we had -- you mentioned 40 gallons. If we were that far off,
5 it was definitely something to be concerned about. We needed
6 to be finding that. And I don't know where the cutoff was."

7 Q "Okay. How about Ken Kjos? Did you know Ken?

8 THE REPORTER: "Kjos?

9 COUNSEL FOR WEISS PLAINTIFFS: "K-j-o-s.

10 THE WITNESS: "Yes, I know Ken.

11 Q (By counsel for *Weiss* plaintiffs) "Did Ken also strike
12 you as an honest, trustworthy employee?

13 A "Yes, he did."

14 Q "Other than the barrel dumping that we've talked about
15 today, do you have any knowledge whatsoever of how
16 perchloroethylene could have gotten into the ground at Dyce
17 Chemical?

18 A "No idea. You know, since, since the first contact, I've
19 been thinking about that, and I don't know how that could have
20 happened.

21 "The only thing that occurred to me is, is that possibly
22 one of those, one of those sediment pits in the back leaked,
23 because as far as running over, they were real cautious about
24 that. They didn't -- when they got full -- you know, they'd
25 fill up with rainwater, you know, and when they got full, you

1 know, they drummed it off or they, they pumped it back to the
2 evaporation ponds.

3 "But as far as that -- and I can remember twice or three
4 times a year going back there, and one of those ponds, they'd,
5 they'd use two and let one of them dry, and they'd, they'd
6 clean up, and they'd put a coating in there. And so as far as
7 that, that's the only way that I could think of that it could
8 possibly be, you know.

9 Q "Did you ever have an opportunity to look at the bottom
10 of those pits when they were dry?

11 A "Yes. I cleaned -- at one time or another, I cleaned all
12 three of them.

13 Q "What was the appearance of the concrete?

14 A "It was, it was pitted and chemically attacked, you know.
15 Like I say, they sealed the corners with, with different
16 products. Usually a tar. They used to seal those corners to
17 keep them from . . .

18 Q "And you said that there was sludge removed from those
19 pits?

20 A "Yes, sir.

21 Q "You said that that sludge was treated as hazardous
22 waste?

23 A "Yes.

24 Q "Why was that?

25 A "Because of where it came from. I mean, it came from

1 those retaining areas off of those tanks and off those tank
2 farms. It, it, it was all, you know, it was all, all stuff
3 out of those tanks from one point or another, and it was, it
4 was the water that drained off of that, that whole lot that
5 came back into those, into those pits.

6 Q "Let me ask you this. How many, how many barrels of the
7 liquid that came out of those pits would you have when you
8 drained the pits?

9 A "Oh, gosh. One time we had a bunch of them. I'm trying
10 to think. We cleaned the one pit, and I remember we had like
11 30 barrels of stuff that we, you know, we drummed up as
12 hazardous waste.

13 Q "So what did you do with that 30 barrels of hazardous
14 waste?

15 A "We set it, we set it on pallets, and then a hazardous
16 waste truck came and picked it up and hauled it off."

17 Q "Do you have any idea whether water like that, from those
18 pits, was ever dumped out back the way that these other drums
19 were dumped?

20 A "No, not that I recall.

21 Q "Based on the six years that you worked there, including
22 the time that you worked as warehouse manager, do you think
23 that, that Dyce became a safer facility from the perspective
24 of preventing environment contamination during the time that
25 you worked there?

1 A "I think there was a growing concern. Yes, I do. I
2 believe that that occurred."

3 Q (By counsel for Beall Trailers) "During your time, do
4 you recall any problem with the tanks rusting in the tank farm
5 area?"

6 A "I do. There was several of them that had been replaced,
7 and during the time that I was there, but I don't recall that
8 any of them were ever a perc tank.

9 Q "Okay. When the tanks were replaced, do you know, were
10 they tested prior to that, or how was it determined they
11 should be replaced?"

12 A "Just visually. Inspection of the tanks was the only
13 thing that I could think of that we ever did to make sure that
14 the tanks weren't leaking or that the product was contained
15 safely.

16 Q "Who was generally involved in the visual inspection, do
17 you know?"

18 A "There again, Dick Colver took care of the tank farm, and
19 usually when I was managing the warehouse, it was me or
20 whoever the manager was at that time.

21 Q "And when did you leave Dyce?"

22 A "'94. Early '94.

23 Q (By counsel for Dyce Chemical) "Did you talk about any
24 of the facts or any of the things we talked about here in your
25 deposition today? Did they ask you any questions about the

1 operation at Dyce?

2 A "Yes, they did. Some of the same questions that I have
3 answered today were some of the things that we talked about in
4 that phone conversation."

5 Q "One of the things that we talked about today was
6 training. Do you think the training that employees at Dyce
7 received was adequate?

8 A "Yes. I think that they went full length to give us the
9 training that was necessary.

10 Q "We spent quite a lot of time talking about what we
11 called the spills or drips from hoses. First I understood you
12 to say that you seldom had spills. Is my recollection
13 correct?

14 A "That's correct.

15 Q "And then I understood you to say that you might have a
16 half a cup or thereabouts come out of the hoses when you
17 finished drumming or moving product; is that correct?

18 A "That's correct."

19 Q "Again, am I correct that normally you would have drip
20 pans to catch that sort of, call it a spill?

21 A "Okay. A spill would be when you lost control of the
22 product.

23 Q "Okay.

24 A "And then when you catch it in a catch pan, I, you know,
25 I didn't consider that -- maybe a definition of terms, maybe,

1 but if we caught it and contained it, what splashed out or
2 what residue was in the hose was the stuff that we washed down
3 the drain."

4 Q "What were the blue plastic drums used for?

5 A "Blue plastic, plastic drums contained products that
6 would not eat up the plastic drums. They were usually
7 glycols. Our acids were all in -- acids and caustics were all
8 put in plastic drums.

9 Q "What were the steel drums used for?

10 A "Materials that would dissolve plastic. We're talking
11 about xylene, the trichlors, and things like that that would
12 eat plastic, would dissolve plastic."

13 Q "Did Dyce have a policy that drums weren't supposed to be
14 dumped?

15 A "Yes, I think they did. They did. It was one of those
16 policies that was set, and it was in the heat of getting
17 loaded; you know, do what it takes to get them loaded. And it
18 was just -- you know, if we didn't dump them prior to that,
19 you know, when the truck driver and the route drivers came
20 back, they were supposed to have all those drums emptied
21 before they put them in the stack, and that didn't always
22 happen.

23 Q "Was there also a policy that when drums were returned
24 from the customers, that they were supposed to be emptied?

25 A "That's correct.

1 Q "Did you ever discuss in any Dyce safety meetings or
2 other type of Dyce meetings those two policies, the policy
3 that drums were supposed to be returned empty and the policy
4 that they weren't supposed to be emptied? Did you ever
5 discuss those?

6 A "Yes, we did.

7 Q "And who did you discuss those with?

8 A "We had -- there were meetings when we had -- the
9 management was there, usually Dave Warne and Jim Diede. The
10 sales guys that were up front, and the warehouse staff would
11 be there.

12 Q "In some of those meetings, did Dave Warne and Jim Diede
13 refresh people's memory that they had this policy on empty
14 drums being returned and not dumping drums? Did they ever
15 discuss that, as you recall, at any safety meetings or other
16 type of meetings?

17 A "Yes, they did."

18 Q "Was Monte Naff ever at any of those safety meetings or
19 company meetings?

20 A "Occasionally."

21 Q "Now I take it that Dyce handled lots of different types
22 of products; is that correct?

23 A "That's correct."

24 Q "So you were the foreman just for a few months?

25 A "First -- yeah. Well, it was longer than that. It was a

1 year or better. Close -- well, no. How did that work? I
2 drove truck, and then I helped, and then I -- gosh. Last
3 thing I did was drive a delivery truck, and Ken Kjos was the
4 foreman.

5 THE REPORTER: "Ken Kjos?

6 THE WITNESS: "Yeah. But I don't remember when that
7 transpired, when that all happened."

8 Q (By counsel for Dyce Chemical) "Okay.

9 A "I don't recall."

10 Q (By counsel for Weiss plaintiffs) "Mr. Brill, I have
11 three short questions for you. My first question is Mr. Ross
12 asked you a question about whether or not you thought Dyce was
13 cautious and conscientious about spill prevention, and I'd
14 like to ask you if, in your mind, the dumping of drums that
15 you related today qualifies as cautious and conscientious
16 behavior.

17 A "That would be the one area that we probably fell down.
18 Probably not.

19 Q "So you don't think that was cautious and conscientious?

20 A "No.

21 Q "Would you like to change your answer in that respect?

22 A "Overall, you know, overall we were real cautious, and in
23 that respect, we probably -- yes, I guess I would have to.

24 Q "Okay. Mr. Ross also asked you whether you thought your
25 training was adequate. Did you ever get any training from

1 anyone at Dyce to stop reconditioners or other Dyce employees
2 if you saw them dumping drums behind Dyce's facility?

3 A "No.

4 Q "Do you think that your training was inadequate, then?

5 A "No, because they, like I said, they told us that we
6 weren't supposed to do that, and in an effort to get the job
7 done, we did it."

8 THE COURT: Call your next witness.

9 MR. CRANE: Thank you, Your Honor.

10 The insurers call Dr. Yaron Sternberg.

11 WHEREUPON,

12 YARON M. STERNBERG, Ph.D.,
13 called for examination by counsel for plaintiffs, after having
14 been first duly sworn to testify the truth, the whole truth,
15 and nothing but the truth, testified as follows:

16 DIRECT EXAMINATION

17 BY MR. CRANE:

18 Q Ready to go?

19 A Yes, I am.

20 Q All right. Can you state your name, please?

21 A Yaron M. Sternberg.

22 Q Dr. Sternberg, what do you do for a living?

23 THE COURT: You can pull the mike towards you.

24 THE WITNESS: (Complied with request.)

25 THE COURT: There you go.

1 THE WITNESS: I have two positions. The first one
2 is I'm an emeritus professor of civil engineering at the
3 University of Maryland in College Park. The second is I'm a
4 principal of a consulting firm by the name of Signum
5 Environmental, Inc.

6 BY MR. CRANE:

7 Q All right. Let's start with the first one. How long
8 have you been a professor at the University of Maryland?

9 A I believe, my recollection is right, I joined the faculty
10 in 1971 as an associate professor, and I became a full
11 professor in either 1973 or 1974.

12 Q And what is civil and environmental engineering? Can you
13 describe that for us?

14 A The department offers courses both in civil engineering
15 and in environmental engineering. In the early 1970s, there
16 was less focus on environmental engineering and more focus on
17 civil engineering courses, such as bridge building, soils,
18 transportation, and so on. And as our awareness of
19 environmental, general environmental issues became greater,
20 the shift moved from civil engineering to more and more
21 environmental engineering, and today I think the ratio is
22 about 50/50.

23 Q All right. So what do you teach at the University of
24 Maryland?

25 A I teach both graduate and undergraduate courses in

1 environmental engineering. The undergraduate courses consist
2 of fluid mechanics and groundwater hydrology. The graduate
3 courses consist of groundwater hydrology and hazardous waste
4 management.

5 Q Can you describe briefly what groundwater hydrology is?

6 A Groundwater hydrology is the study of the occurrence and
7 movement of groundwater. Groundwater is that part of the
8 water cycle, if you wish, that resides below the surface of
9 the earth. Almost anywhere in the world, if you go and drill
10 a well, at some point you're going to encounter water. It may
11 be good water, it may be brackish water, but you're going to
12 encounter some water.

13 And in most places, this water is moving slowly or
14 slightly faster, and it is moving from one point to another
15 point, and it is continuously moving. As it moves, it
16 dissolves whatever constituents there are in the pores that
17 the groundwater fills. And as it moves, it dissolves and
18 carries these dissolved constituents to other places. For
19 example, if you look at groundwater in areas that have
20 limestone, the groundwater will be hard. It will consist of a
21 lot of calcium carbonate. If we're looking at the groundwater
22 in this site, if you have perc in the saturated soil and the
23 groundwater moves through it, it will dissolve some of the
24 perc and will carry it with it.

25 Q All right. Let's talk about the other part of your

1 worklife, and that's your work at Signum. Can you tell us
2 about that?

3 A As I said, Signum is an environmental consulting firm,
4 and I established Signum in 1994, and the work that we do is
5 primarily associated with evaluation of environmental data
6 collected by others. We do not go out and collect data
7 ourselves. We do not have drilling rigs. We do not have
8 geologists.

9 What we do is rely on the data that has been generated by
10 others, collect all of these data, evaluate it and analyze it
11 to answer questions such as, Where did the contamination start
12 from? When did it start? What is the projection; if we want
13 to clean the groundwater, how long is it going to take? What
14 is the likelihood that we will get clean groundwater? And
15 questions of this nature, in other words, associated with the
16 migration, generally, of contaminated groundwater.

17 Q Have you worked in relation to Superfund sites?

18 A Yes, I've worked in quite a few Superfund sites.

19 Q All right. And how about with chlorinated solvents?

20 A Yes, quite a few of those were chlorinated solvents. As
21 a matter of fact, I think last data that I've seen, about 70
22 to 75 percent of all the Superfund sites are there because of
23 chlorinated solvents.

24 Q So is it fair to say that your consulting part of your
25 worklife generally involves groundwater contamination issues,

1 including Superfund and chlorinated solvent issues?

2 A That's correct.

3 Q How long have you been doing that kind of work?

4 A Well, I started doing consulting work in 1965, and today
5 is 2010, so about 45 years.

6 Q All right. And can you give us a sense of who some of
7 your clients are in your consulting work?

8 A They range from large industries, municipalities. The
9 United States Agency for International Development, which is
10 part of the state department. The World Bank. The real
11 estate developers. I probably missed one or two, but it
12 covers a whole host of different clients.

13 Q Do you work for insurance companies?

14 A Oh, yes. And I forgot, and insurance companies. Thank
15 you.

16 Q All right. And so tell us about your education and
17 background that allows you to do the kind of consulting work
18 and the teaching work that you do in the environmental field.

19 A I received my bachelors degree in agricultural
20 engineering from the University of Illinois in 1961. And then
21 I moved to the University of California at Davis and received
22 my masters in 1963 in water and groundwater hydrology. And I
23 then continued on and received my Ph.D. in 1965, again in
24 groundwater hydrology.

25 Q Now are you acquainted with Dr. Powell who is the expert

1 for Soco?

2 A Yes, I am.

3 Q And how did you become acquainted with him?

4 A Dr. Powell was my student at the University of Maryland.
5 He did his Ph.D. dissertation, doctoral dissertation, under
6 me.

7 Q Can you give us a sense of some of your professional
8 affiliations related to the area that we're talking about?

9 A I am a member, I think it's a life member, of ASC, the
10 American Society of Civil Engineering. I am a member of the
11 American Geophysical Union. I just dropped membership with
12 the National Water Well Association. I probably am a member
13 of one or two other organizations. I don't know.

14 Q And have you appeared in court and in depositions as an
15 expert in these kinds of matters?

16 A Yes. I appeared in a number of federal and state courts.

17 Q All right. And you have been retained by counsel for
18 USF&G and Continental in this case to provide an expert
19 opinion; is that right?

20 A That's correct.

21 Q Are you being compensated for your time?

22 A Yes, I am.

23 Q How much?

24 A At the rate of \$265 an hour.

25 Q Let's turn to what you were asked to do as it relates to

1 what you're going to talk about today.

2 A I was asked to estimate the amount of perc and its
3 degradation product in the subsurface environment, starting
4 from the area known as the northwest corner, all the way down
5 to the Yellowstone River.

6 Q All right. Let's pull up Exhibit 3059, page 121, and
7 maybe you can show everyone the area you're talking about.

8 A The area that I'm talking about is the -- whoops.

9 Q We moved it on you. Let's try it again.

10 THE CLERK: Lower right on the screen.

11 THE WITNESS: (Complied with request.)

12 BY MR. CRANE:

13 Q All right. Try it again.

14 A (Complied with request.)

15 Well, let's put it this way. The green area, the blob as
16 it's called, the sort of elongated area is known as the
17 northwest corner, and the allegation is that perc was released
18 in this particular location. And I was asked to look at all
19 of the available data and come up with an estimate of how much
20 perc is there in the subsurface environment, starting from the
21 northwest corner area of the green elongated area and
22 extending all the way to the Yellowstone River.

23 Q Can you show us where the Yellowstone River -- the
24 direction of it, anyway?

25 A The direction would be out here, but it's off, it's off

1 the map.

2 Q All right. And is there other perc contamination in the
3 area that you have not included in your evaluation amount?

4 A Yes. If you look at the -- this area in here, you can
5 clearly see that there is gold or light-yellow-color plume
6 indicated, and that plume originates from the Dyce operational
7 area. And the contamination originates and starts from the
8 Dyce area and moves through the north -- through the area we
9 talked about, the northwest area, and continues on towards the
10 Yellowstone River.

11 Q Now why did you not include that contamination that
12 you've described as originating from the Dyce operational area
13 in your calculation for the amount of perc in the northwest
14 corner to the Yellowstone River?

15 A Because the allegation was that the release of perc
16 occurred in the northwest corner, and, therefore, my task was
17 to start from the northwest corner and carry northwest all the
18 way to the point where it discharges into the Yellowstone
19 River.

20 I'd like to point out while we are talking about this --
21 how do I erase?

22 THE CLERK: Lower right corner.

23 THE WITNESS: I'd like to point out something that
24 may or may not be obvious. We have groundwater that is moving
25 in the northwest direction and has been moving in that

1 direction for many, many, many years, long before, you know,
2 Dyce started operation there, and you can see the green arrow.
3 That starts with clean groundwater. Groundwater at that
4 particular location is clean. Once it moves into the Dyce
5 operational area, that's where it starts to pick up the
6 contaminants, and it continues now as contaminated water and
7 reaches all the way to the Yellowstone River.

8 BY MR. CRANE:

9 Q All right. Let's talk about some of the things you
10 studied and reviewed to formulate your opinions. Can you give
11 us a sense of the material that you reviewed?

12 A As you heard a number of times, there have been numerous
13 documents that have been generated by various consultants.
14 There were consultants for the government. There were
15 consultants for Soco and its predecessors. I reviewed all of
16 those. And each one of those documents has generally a text
17 and then a number of appendices, and the appendices contain
18 all of the sort of the nitty-gritty data.

19 And I believe I reviewed all of these, and these will
20 include information on the types of soils that you encounter
21 on the concentration of different constituents, both in the
22 groundwater and in the soil. It will include information as
23 to the physical characteristics of the soil; in other words,
24 What's the density of the soil? What is the weight of the
25 soil? All sorts of other pieces of information that, in my

1 area of study, are important.

2 In addition to all of those documents, I also reviewed a
3 fair number of depositions. I have been in court here since
4 Monday afternoon, so obviously I heard all of the testimony to
5 date with the exception of Monday morning.

6 And in addition to that, I looked at the number of aerial
7 photographs, and if my memory serves me right, I spent a day
8 at the site, and I believe it was in August of 2009, looking
9 over and sort of getting familiar with the site.

10 Q All right. And based on all of that review and study,
11 have you formed an opinion as to the amount of perc and its
12 degradation products in the northwest corner and to the
13 Yellowstone River?

14 A Yes, I have.

15 Q And why don't you go ahead and give us your opinion.

16 A My opinion is that approximately 80 gallons were released
17 in the northwest corner.

18 Q In that 80 gallons, in your opinion, are you including
19 both soil and groundwater contamination?

20 A Yes, I do.

21 Q How many gallons do you conclude are in the groundwater?

22 A Approximately 40 gallons are in the groundwater, and
23 approximately 40 gallons are in the soils.

24 Q Do you agree with Dr. Powell as to how much is in the
25 groundwater?

1 A Yes, I do.

2 Q Do you agree with Dr. Powell about how much is in the
3 soil?

4 A No, I do not.

5 Q All right. Why don't we pull up Demonstrative 491. Will
6 this demonstrative help you --

7 A Yes.

8 Q All right. Explain -- go ahead and explain.

9 A What you see in front of you is a summary of perc and
10 perc equivalent, and what this means is the mass of or the
11 amount of perc that is represented by the degradation product.
12 And on the left, what you can see is Dr. Powell's analysis,
13 and what you see on the right is my analysis. And we may have
14 broken it up differently and analyzed it somewhat differently,
15 but overall the agreement is quite good. Dr. Powell has
16 estimated there are 36.5 gallons. My estimate is
17 33.8 gallons. We differ by about 10 percent, and I don't
18 think that this difference is significant at all. So as far
19 as the groundwater is concerned, we are, I believe, in full
20 agreement.

21 Q Now I notice that you have concluded about 8 gallons
22 discharged to the Yellowstone River and Dr. Powell has none.

23 A Right. Now what is this 8.1 gallons that discharged into
24 the Yellowstone? If I can have the previous slide for a
25 moment?

1 DOCUMENT TECHNICIAN: (Complied with request.)

2 THE WITNESS: What we have in here, as I said
3 before, we have groundwater that is moving in this direction,
4 and it's obviously contaminated with perc and degradation
5 product and discharges into the Yellowstone River. As I said
6 before, this groundwater is moving, and there may be some
7 disagreement about how fast it's moving, but an approximate
8 number is about 400 or thereabouts feet per year.

9 So if the length of the plume is -- and by that I
10 mean the length of the plume if you measure it from the
11 beginning of the plume from the Dyce operational area all the
12 way to the Yellowstone River, the length is, I believe,
13 something around 3,000 feet. And, therefore, if the velocity
14 of the groundwater is about 400 feet per year, it will take a
15 groundwater particle somewhere between eight and nine years to
16 traverse the distance. In other words, starting here, by the
17 time it reaches the Yellowstone River, it's about eight or
18 nine years. Take 400 and divide by 3,000, you'll find how
19 many years.

20 But we needed to account for that, because the
21 contamination has been in the ground for quite some time, and
22 in order to be fair to the analysis, some of what was released
23 in the northwest corner is already gone, because it has been
24 some 30 years or so, so we accounted for that, and that number
25 we estimate, I estimate to be 8.1 gallons.

1 BY MR. CRANE:

2 Q All right. And Dr. Powell just didn't do that
3 calculation? He didn't come up with anything on that? He
4 ignored that, right?

5 A That's correct.

6 Q So explain to us how you arrived at your opinion
7 regarding the amount of perc contamination in the soil -- and,
8 Your Honor, if we could -- if I could approach? Dr. Sternberg
9 wants to use an easel to explain this.

10 THE COURT: Yes.

11 MR. CRANE: Thank you.

12 THE WITNESS: I left my marker in my jacket.

13 (Discussion off the record.)

14 THE COURT: I don't need to see it.

15 THE WITNESS: Thank you, Your Honor.

16 THE COURT: Nothing personal, but I am not the
17 fact-finder in this case.

18 THE WITNESS: I just want to make sure.

19 THE COURT: Yes. Thank you.

20 THE WITNESS: The question was, how does one go
21 about finding what is the amount of perc in the soil? In
22 order to answer that question, we need information on two
23 things. First of all, what is the concentration of perc in
24 the soil? And I will just write the abbreviation for the
25 concentration of perc in the soil.

1 And the next thing we need to know is what is the
2 volume of the soil that has been impacted? If we know the
3 average concentration, if we know the volume of soil, if we
4 can take the product of the concentration times the volume and
5 multiply that product by a series of constants that everybody
6 agrees on, we'll end up with the amount of perc in gallons.

7 So we have two tests in here. One is to determine
8 what's the concentration. The other one is to determine
9 what's the volume. So let's tackle the first one first. How
10 do we determine what is the concentration?

11 First, you heard this morning concentration can have
12 various expressions, parts per million, parts per billion, and
13 so on. When you're dealing with the concentration of perc in
14 soil, the term that we often use is milligrams per kilogram.
15 Now milligrams of what? It's milligrams of perc and kilograms
16 of soil.

17 So the concentration in soils is generally given in
18 milligrams per kilogram. You heard the term before that the
19 concentration of perc that signifies that we have DNAPL -- I
20 believe the number you heard was 189. That means
21 189 milligrams of perc per kilogram of soil. So this is how
22 concentration is defined.

23 Now milligrams, for those --

24 BY MR. CRANE:

25 Q Dr. Sternberg, can I just stop you right here for one

1 second?

2 Is any of what you've just described controversial?

3 A No, not at all.

4 Q That's generally accepted?

5 A Yes.

6 Q All right.

7 A Now just to give you a sense of what these terms are, a
8 kilogram is about 2.2 pounds, and there are about a million --
9 not "about." There are a million milligrams in a kilogram.
10 So when we look and we look at a number like 189 milligrams
11 per kilogram, we are talking about a relatively small
12 concentration. It's a relatively small amount of perc in a
13 kilogram of soil.

14 So the first thing that we need to understand, then, and
15 the first value that we need to obtain is what is the
16 concentration of perc in the soil in terms of milligrams per
17 kilogram?

18 So we'll get back to this in a moment.

19 The next thing we need to understand is what is the
20 volume of soil that is being impacted? Now you heard
21 Dr. Powell talk about that in his estimation, there have been
22 about 200 to 300 gallons of perc released in the northwest
23 corner. Well, what does it amount to in terms of the depth of
24 perc on the soil itself?

25 Now if you recall, the little green area that was shown

1 on one of the previous slides, doesn't exactly look like this,
2 but it's close enough, and this area is approximately 5,600
3 square feet.

4 Now if you believe that perc occupied or evenly
5 distributed over this 5,600 square feet, what you would do is,
6 or to find out what is the depth, you will take one of those
7 values and, for the sake of being on the conservative side,
8 let me use the 300 gallons.

9 So if I want to find out what is the depth of perc if it
10 is evenly distributed over this 5,600 feet, what I would do is
11 I would take, first of all, the 300 gallons, and I would
12 convert it to how many cubic feet it is. And there are
13 7.5 gallons in a cubic foot.

14 Q Is that just a mathematical calculation? Nothing
15 controversial about that?

16 A This is a constant, you know. This is a known constant.

17 And, therefore, this gives me 40 cubic feet of perc, and
18 if now I take the 40 cubic feet of perc, divided by 5,600
19 square feet, what you get is about a little more than 1/16th
20 of an inch.

21 Now this is sort of unrealistic because what we assume is
22 that the perc is distributed evenly. If it occupied 1/16th of
23 an inch, we wouldn't be here, because all of that perc would
24 evaporate, so clearly that is not the case. So what is -- so
25 let's start with some reasonable amount of perc that could

1 have accumulated on the soil.

2 So if you ask yourself, how much will 40 cubic feet --
3 what kind of an area will it require for 1 inch, you will find
4 out that this area in here is equal to 500 square feet. That
5 means that if now we are looking at an area that receives
6 1 inch uniformly distributed, this area now drops down to
7 500 square feet.

8 Now this is just an example. Let's see what happens if
9 we have 1 inch of soil -- of perc on the soil.

10 I've looked at some aerial photographs, and the northwest
11 corner is an area that has not been disturbed. It has not
12 been graded, has not been flattened, so a normal soil area has
13 an undulating surface. You have low places, you have high
14 places, and, therefore, what you have in here is simply an
15 uneven surface.

16 And before I start with this, if we can see the next --

17 MR. CRANE: Can we pull up Exhibit 3051, page 812?
18 And if we could focus in on PT-2, I think?

19 DOCUMENT TECHNICIAN: (Complied with request.)

20 BY MR. CRANE:

21 Q Does that help you, Dr. Sternberg?

22 A Yes. What you can see, then, this is a cross-section,
23 and you have seen this figure a number of times. This is a
24 cross-section; in other words, a geological cross-section of
25 about the center of the green area.

1 Q And this is from the feasibility study, correct?

2 A It's either from the feasibility or from the ROD, but
3 this particular figure appears in almost every document.

4 Q All right. Go ahead.

5 A But what you have in front of you is you can see the
6 yellow area or the light brown area is the topsoil which is
7 silty clay, and then you can see the blue line which is the
8 water table. What I'd like to do is to sort of blow this up
9 and talk a little bit about this area.

10 So what we have in here is we have an area in here,
11 which, the distance from the soil surface to the water table
12 is about 5 feet, and this whole area in here, the vertical
13 area here, is simply a silty clay material, and it carries on
14 below the water table.

15 Q Can you label the water table? I know there's a symbol
16 there, but if you can --

17 A Yes.

18 Q Thanks.

19 A (Complied with request.)

20 Now what does this water table mean? What we have below
21 here is totally saturated zone. That means that only two
22 things are in here: soil and water. There's absolutely no
23 air in here. And this is the groundwater that I talked to you
24 before is moving at a rate of about 400 feet per year from the
25 right to the left on your screen, and it is just water.

1 Q Now it's not -- let me just stop you for a second. It's
2 not like a, in that saturated zone, it's not like a river of
3 groundwater?

4 A No, no, no, no, no. It's not a river at all. It's
5 simply the groundwater that is within the pores -- between the
6 soils are pores, and it moves around the pores -- and it is
7 moving in a northwest direction. There are no big rivers
8 here.

9 And what we have on top of the water table is known as
10 the unsaturated zone, and this zone has three things: it has
11 air, some water, and the silty clay particles.

12 So let's see what happens if an inch of perc gets trapped
13 or pooled on the soil surface. So this, this, this, I'm going
14 to start here with 1 inch of soil. You heard that it's
15 heavier than water, and as it's heavier than water and it
16 moves rather -- it's less viscose than water, it will
17 penetrate the soil, and as it penetrates the soil, it is going
18 to migrate downward. And as it migrates, it's going to coat
19 the silty clay particles. So now the silty clay particles
20 have a little bit of perc attached to those particles.

21 And at some point, and whether it is a week or two weeks
22 or as many weeks or as many days, it is going to reach this
23 water table. And as you recall, Dr. Powell said that the
24 characteristics of perc are such that even though it is
25 heavier than water, it cannot penetrate the groundwater

1 directly; it needs to pool up to develop sufficient pressure
2 to break through, and I fully agree with him. There is no
3 disagreement there. That's the, one of the characteristics of
4 perc.

5 So the question, then, is two things:

6 First of all, One inch of perc, how much of perc are we
7 going to see above the water table?

8 Question No. 2 is, Is this enough to break through?

9 So let's address the first question first. If you have a
10 beaker that has no water, and you have two identical beakers,
11 one has an inch of water and one has no water, you pour 1 inch
12 to the new beaker, you're going to see 1 inch of water.

13 Now take the same beaker and fill it with sand, and fill
14 it to a height of, let's say, 5 inches. This is all now sand.
15 Take the beaker where you had 1 inch of water and pour it into
16 the beaker that has the sand, and how much water is now going
17 to be in the beaker of sand? It's not going to be 1 inch
18 because the water has only to fill the pore space. It doesn't
19 have to fill the solid particles. It has only to fill the
20 pore space, and it is a function of the porosity of the soil.
21 The porosity of the soil is the amount of pore space that the
22 water has to fill. And the calculation is very simple. If we
23 assume for the sake of simplicity that the porosity is
24 25 percent, the height that the water will rise is 1 over 25,
25 or 4 inches.

1 Q Now why did you use 25 percent there?

2 A For one reason, it's simple, 1 over 25 percent. The
3 other reason is that this number appears in the, in the ROD
4 and in various documents; the porosity of the actual soils in
5 here, anywhere from 25 to 30 percent, so instead of dividing
6 by 30 percent, 25 percent is easier.

7 Q All right.

8 A So what we have now is that 1 inch of perc, by the time
9 it gets to the water table, is going to have somewhat less
10 than 4 inches because it coated some of the material in here.

11 But let's, for the sake of simplicity, forget that it
12 coated anything. It starts from here, ends up in here, and
13 now we have 4 inches of perc sitting on top of the water
14 table.

15 The question is, Does 4 inches of perc generate
16 sufficient pressure for the perc to break through? And the
17 answer is, No. The amount of perc that you need to develop
18 sufficiently high pressure in here that will allow the perc to
19 break through, the minimum is about 8 inches.

20 So what does it translate to? It translates to the fact
21 that now we need not 1 inch; we need 2 inches of perc. And if
22 we need 2 inches of perc, the area is no longer 500 square
23 feet; it is now 250 square feet. Or, stated differently, we
24 needed 2 inches of perc in the little pool in here because
25 without it, it cannot penetrate into the groundwater, and we

1 know that the groundwater is contaminated, so we know it
2 penetrated, and, therefore, you need 2 inches in here in order
3 to break into the groundwater.

4 We also know that if we start from 300 gallons and we
5 want 2 inches of perc, that means that we now have an area
6 that's contaminated only 250 square feet. Now that doesn't
7 mean that the 250 square feet must be contiguous. It can
8 be -- if you look at the northwest corner, there can be a
9 little place in here and a little place in here and a little
10 place in here, so on, so forth, as long as they all, the
11 little areas, combine to 250 square feet. So this is how the
12 perc gets into the groundwater.

13 Now what we need to do is to try to figure out, from this
14 information, how the area that I talked about, how do we
15 translate it into a volume of soil?

16 And can I have the next slide?

17 Q You want this one here?

18 A Yes.

19 THE COURT: Can we take a break here?

20 MR. CRANE: Sure. Thank you, Your Honor.

21 THE LAW CLERK: All rise.

22 (Recess taken from 14:44:44 to 14:57:09.)

23 (Open court.)

24 (Jury present.)

25 THE COURT: Please be seated.

1 You may continue.

2 MR. CRANE: Thank you, Your Honor.

3 BY MR. CRANE:

4 Q Now, Dr. Sternberg, before the break, you were talking
5 about your calculations of volume and concentration. Can you
6 just give us a brief summary of the significance of those
7 calculations?

8 A Yes. The significance is this. Again, if you need, if
9 you need 2 inches of perc in order to break into the
10 groundwater, and for 300 gallons that Dr. Powell assumes, that
11 translates into a total area of 250 square feet.

12 Now if you look at the area that Dr. Powell used, which
13 is 5,600 square feet, and you ask yourself, okay, what kind of
14 a volume of perc do I need to generate this 2 inches of perc,
15 and the answer for that is 7,000 gallons. Obviously, nobody
16 has testified 7,000 gallons. That's more than half of the
17 amount that Dyce used in a year.

18 So the fact is that what we are looking at is a much
19 smaller area of contamination. It's not 5,600 feet. There
20 are pockets in here of contamination that make up a total of
21 250 square feet.

22 Q All right. Now you've testified that you obviously
23 disagree with Dr. Powell's number. Can you explain why you
24 disagree? Where do you believe Dr. Powell went wrong?

25 A All right. If I can have the next --

1 Q Do you want the demonstrative up?

2 A Yes.

3 MR. CRANE: 612, please, Neil. Thank you.

4 DOCUMENT TECHNICIAN: (Complied with request.)

5 BY MR. CRANE:

6 Q You're going to have to -- Dr. Sternberg, if you need to
7 look at it, it's going to be on the screen.

8 A Thank you.

9 What you see in front of you is a cross-section through
10 the northwest corner. The area on top, the green, corresponds
11 to the area of the northwest corner.

12 Maybe just for clarification can we see the first slide?

13 MR. CRANE: Sure. Let's pull up 3059-121.

14 DOCUMENT TECHNICIAN: (Complied with request.)

15 THE WITNESS: You can see the green area in here,
16 and now, if you visualize this on the side, let's go back to
17 the -- now we have this area sitting on top here. And what we
18 are looking at is the soils that are underlying this total
19 cross-section of area. And what Dr. Powell has done is he
20 broke it into five sections; I'm sorry, into four sections.
21 The first section is zero, meaning from the soil surface down
22 to 4 feet. The second section is from 4 to 8 feet. The third
23 is 8 feet to 12 feet, and the last one is from 12 feet to
24 25 feet.

25 What I'd like to focus on is the first area, the

1 zero to 4 feet.

2 If I can have the next slide, please?

3 MR. CRANE: All right. 432, page 1, please.

4 DOCUMENT TECHNICIAN: (Complied with request.)

5 BY MR. CRANE:

6 Q Okay. It's clear now. Good.

7 A What you see in here is now, again, the northwest corner
8 or the 5,600 square feet. Now it's divided into six different
9 zones marked A through G. And you can see, in two of the
10 zones, in Zone D and in Zone C, you can see a series of
11 letters and numbers. These are borings from which soil
12 samples were collected. So we have PZ-1 and PZ-8 and PZ-9 in
13 Area D, and PZ-10 and a boring marked SB-4 also in Area C.

14 And since these are soil samples that were collected and
15 analyzed by laboratory, we have the data for these five
16 samples.

17 And can I have the next slide, please?

18 DOCUMENT TECHNICIAN: (Complied with request.)

19 MR. CRANE: It should be up there.

20 THE WITNESS: Yes, but I don't have the copy. I
21 want to write. Can I have yours?

22 (Discussion off the record at the podium.)

23 THE WITNESS: So what I'd like to do is to simply
24 mark this in here. We have the zero to 4 feet, and what you
25 see in front of you, you see four black locations and one

1 orange. And, again, what does it mean? Let's take the PZ-1.

2 The depth of the soil, or from where the soil was
3 collected, was from zero to 2 feet, so that means that the
4 soil sample went from zero to 2 feet. This is the soil
5 sample. Next we have what was the date that the soil was
6 collected, and you can see it's July of 2003. And the last
7 piece of information is what was the concentration of perc,
8 and this is in milligrams per kilogram. So what was the
9 concentration of this particular soil sample?

10 So now if we look at this, at the four, and you can
11 see that the four black ones range somewhere between 1 and 10.
12 The lowest one is 1.4. The highest one is 9.6. But the
13 general range, we have four samples that range from 1 to 10.
14 These are all the black samples. And then we have one sample
15 in orange that was collected in 2004, and that concentration
16 is 11,050 milligrams per kilogram. So we have a total of five
17 samples; four samples, 1 to 10, and one sample, 1,050.

18 And what Dr. Powell did is he combined the five
19 samples, so he added the values in the black, the values in
20 the orange, divided by 5, and found out an average
21 concentration of 300 and -- 236 milligrams per kilogram is the
22 average of these five numbers that you see in front of you.
23 And this is wrong.

24 BY MR. CRANE:

25 Q Can you explain why you think that's wrong?

1 A Yes. Let me give you sort of a financial analysis.
2 Imagine that there are -- there's a street with 25 homes. We
3 know the salary of five of the individuals. There are four
4 homes, each having a salary of \$50,000 and one having a salary
5 of \$5 million. The average of these five numbers is
6 \$1.04 million.

7 Now why did I pick these numbers? Remember that the
8 range of the four samples were 1 to 10, and one sample was
9 1,150. If I am trying to do a comparable analysis, I have
10 four families, each making \$50,000. The outlier or the large
11 should be in the same ratio of the 1 to 10 to 1,150. And what
12 is this ratio? It is approximately 1 to 100. 1,150 is about
13 100 times greater than 1 to 10. And, therefore, if we are
14 looking at 50, if we multiply it by 100, we're getting
15 5 million, and the average of this is \$1.04 million.

16 So what does it mean? It means that the five families
17 that we are talking about, right now, each one is making
18 \$1.04 million. Just imagine what's going to happen when the
19 IRS gets hold of this data. The next thing you know, these
20 five families -- or four families are going to be subjected to
21 an audit because they'll claim that they clearly
22 underestimated their income by a million dollars.

23 It gets worse than that, because the next thing is, if
24 you take this \$1.04 million and assign it to the remaining
25 20 families, we have no idea what their income is, but now,

1 based on the average, they're now earning \$1.04 million. And
2 this is what Dr. Powell did in his analysis.

3 If you look at the diagrams, zero to four samples -- zero
4 to 4 feet what we have now is that each zone, A, B, C, D, E,
5 F, G, has an average concentration of 236 milligrams per
6 kilogram. As you can see, there is absolutely no data for A,
7 B, E, F, and G. But doing this average and assigning this
8 value of 236 to each one of the areas translates to a very
9 large and, in my opinion, unrealistic average for this whole
10 area.

11 And now if you want to find out the volume, you take this
12 236 milligrams per kilogram -- or that's what Dr. Powell has
13 done -- you multiply by this total volume, which is about
14 5,600 feet and the depth is 4 feet, you get a very large
15 volume, you get a very large average concentration, and you
16 end up obviously with a very large volume of perc.

17 Q Now did Dr. Powell apply this same methodology that
18 you've just described across the site and to all layers down?

19 A The same methodology was applied to the subsequent
20 layers.

21 Q So bottom line, what's the effect of Dr. Powell's
22 averaging on the calculation of the amount of the perc in the
23 soil?

24 A Well, obviously it inflates the amount of perc that is in
25 the soil, and it's all because of the improper way that the

1 averages were calculated.

2 Q Now what did you do to account for that problem?

3 A I used an averaging technique that is known as the
4 weighted average, and what that technique does is it assigns a
5 certain weight to a concentration, so if you have a high
6 concentration over a smaller area, and a middle concentration
7 with a slightly larger area, it accounts for the product of
8 each one of those, and then we divide by the total area, and
9 we get much more realistic averages.

10 Q And is this weighted averaging that you used a generally
11 accepted method, statistical method, when you have an outlier
12 like you're talking about?

13 A Yes, it is.

14 Q All right. I think you can go ahead and sit down.

15 A (Complied with request.)

16 Q Let me turn to another topic, Dr. Sternberg. You heard
17 testimony from Mr. Sullivan that as of about two weeks ago,
18 ATC, through its extraction system, had removed about
19 109 gallons of perc. Do you recall that?

20 A Yes.

21 Q Does that testimony give you any pause or heartburn as to
22 your opinion as to the amount of perc in the soil in the
23 northwest corner?

24 A Absolutely not.

25 Q Can you explain that, please?

1 A Yes. Because I have looked at the data from ATC, and in
2 my opinion, approximately 70 percent of the amount that was
3 reported as 109 gallons actually comes from groundwater.

4 Q Not soil?

5 A Not soil. The remaining approximately 30 percent comes
6 from the soil.

7 Q And then that would be consistent with the opinion you've
8 given today?

9 A That's correct.

10 Q All right. Let me turn to another topic, and that is I
11 think we've heard some testimony or seen the Lockheed report
12 that indicated that there may be around 200 gallons in the
13 groundwater. Does that in any way conflict with your
14 opinions?

15 A No, it does not. The Lockheed report was done, I
16 believe, in 1999, towards the end of 1999. And at that time,
17 really, we didn't have much data, so I don't really assign
18 much credibility to this report, but since Dr. Powell
19 mentioned it, I thought it would be fair to make a comment on
20 it, too.

21 And what the Lockheed report basically says is that based
22 on the data that they had, there is approximately 200 gallons
23 in total in the groundwater over the whole plume. That
24 means -- if I can see the first slide?

25 MR. CRANE: Yeah. Let's blow up 3059, page 121,

1 again, if we could.

2 DOCUMENT TECHNICIAN: (Complied with request.)

3 BY MR. CRANE:

4 Q Thank you.

5 A Thank you.

6 That means that if we start from here and we go all the
7 way to the Yellowstone River, which is not present here,
8 according to the Lockheed report, that 200 gallons in the
9 groundwater, in this plume. Now my analysis says that the
10 groundwater from this point to the Yellowstone River contains
11 about 40 gallons, and this is consistent with Dr. Powell's
12 analysis. So if you look at the value of 200, which is in the
13 groundwater, 200 gallons in the groundwater in the total
14 plume, and you subtract from that the 40 gallons that is
15 present in the groundwater from the northwest corner and
16 northwest, you are left with the cross-hatched area in here,
17 which is 160 gallons.

18 So that suggests that the Dyce facility actually
19 contributed quite a bit of perc to the groundwater.

20 Q From the Dyce operation?

21 A The Dyce operational area. I'm sorry. Yes.

22 Q Right. And obviously the groundwater is apples and
23 oranges with the soil, correct?

24 A Absolutely. You cannot compare the soil to the
25 groundwater, and the Lockheed report only deals with soil --

1 with the groundwater.

2 Q And so are you saying, then, that the 160 or so gallons,
3 if you subtract the 40 from the 200, that's coming from the
4 Dyce operational area, that's just the gift that keeps on
5 giving to the contamination?

6 A That's right. In other words, there is no, there is no,
7 in other words, there is no limit to this. It keeps giving.
8 As I said before, clean groundwater comes in here, and it
9 becomes contaminated in here, and this number, based on the
10 Lockheed report, suggests that it's 160 gallons.

11 MR. CRANE: Thank you, Dr. Sternberg.

12 THE WITNESS: Thank you.

13 THE COURT: You may cross.

14 CROSS-EXAMINATION

15 BY MR. LYNCH:

16 Q Good afternoon, Dr. Sternberg.

17 A Good afternoon.

18 Q You were talking a little bit about the differences
19 between your mass calculations and some of the other mass
20 calculations that have been gathered and mass measurements
21 that have been made by other parties in this action.

22 You find fault, I take it, as you said, with ATC's
23 measurement of the perc they actually got out of the
24 groundwater, correct? I'm sorry, out of the vadose zone with
25 the SV extraction system; is that correct?

1 A I'm sorry. I didn't hear you.

2 Q You found fault with ATC's measurement of the perc they
3 got out of the vadose zone through the soil vapor extraction
4 system; is that correct?

5 MR. CRANE: Objection. Misstates the witness's
6 testimony.

7 THE WITNESS: I didn't say I find fault. I have no
8 way of judging whether the number 109 gallons is correct or
9 not. I first heard it when I sat here; I believe it was
10 either Monday or Thursday.

11 BY MR. LYNCH:

12 Q Did you also compare your mass estimates to the mass
13 estimates ATC made in 2005?

14 A I believe I did compare it, yes.

15 Q And what was the comparison?

16 A I'm not sure what you're referring to. Are you referring
17 to the comparison that, in other words, our checking of the
18 values of ATC?

19 Q No.

20 Julianne, would you please pull up Exhibit 4400?

21 DOCUMENT TECHNICIAN: (Complied with request.)

22 MR. LYNCH: And could you go to page 31 of that
23 exhibit, please? Page 31, please.

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 ///

1 BY MR. LYNCH:

2 Q This is the January 14, 2005 report of ATC. They
3 submitted it to DEQ.

4 A Yeah.

5 Q This is the report you've reviewed in connection with
6 your work; is that correct?

7 A Sure.

8 MR. LYNCH: Could you please go to page 43,
9 Julianne? And zoom in on the fifth bullet point, I believe.
10 Where I put the blue mark.

11 DOCUMENT TECHNICIAN: (Complied with request.)

12 BY MR. LYNCH:

13 Q It states, "The mass of CVOCs within the vadose zone,
14 zero to 5 feet below ground surface, was estimated to be
15 between 750 and 1,550 pounds."

16 A And your question is?

17 Q Is ATC wrong, too?

18 A Well, I believe these numbers are inflated, also.

19 Q Why is that?

20 A Well, can we go back to page -- go back to 4400-0054?

21 MR. LYNCH: Pull that up, Julianne.

22 DOCUMENT TECHNICIAN: (Complied with request.)

23 THE WITNESS: Can I just take my reading glasses?

24 (Pause.)

25 THE WITNESS: Well, let's take a look at Table 3-10.

1 If you look at, let's say, Soil Section A, the only
2 information that is available is from 4 to 5 feet, which says
3 that it's 15 milligrams per kilogram. That is as far as the
4 soil is concerned. Then you have PID readings for other
5 sections of the Section A. The proper way to do it would be
6 to take the depth of soil multiplied by the respective
7 concentration. What they have done is have looked at the
8 total value, averaged it, and then multiplied by the total
9 depth.

10 BY MR. LYNCH:

11 Q So in your conclusion, ATC is wrong as well?

12 A My conclusion is that the computation here is improper.

13 Q Let's look at your computation, then.

14 Can we go back to the ROD figure, 3059-0121?

15 DOCUMENT TECHNICIAN: (Complied with request.)

16 BY MR. LYNCH:

17 Q I believe at the start of your testimony today, you
18 circled that as the northwest corner source area, correct?

19 A Yes.

20 Q And you said the square footage of that area is, I
21 believe, approximately 5,600 square feet?

22 A That's correct.

23 Q And according to this diagram, at least, EPA says that
24 this green area constitutes their estimated extent of source
25 area soils that are contaminated with perc, correct?

1 A That's correct.

2 Q And you understand that that entire green area is -- are
3 the soils that EPA is asking Soco to clean up in this action?

4 A You are missing the word "estimated." It's simply an
5 estimated area.

6 Q Certainly, an estimated area.

7 A That's correct.

8 MR. LYNCH: And you go to -- please go to ROD
9 Figure 11, which is 3059-0125.

10 DOCUMENT TECHNICIAN: (Complied with request.)

11 MR. LYNCH: Actually I believe it's the page before
12 this, 012 -- I have the wrong page number. One moment.

13 I was right, 125.

14 MR. JOHNSON: Your Honor, I'm having a little
15 trouble hearing. Can he pull the microphone out?

16 THE WITNESS: (Complied with request.) Sorry.

17 MR. JOHNSON: Thank you.

18 BY MR. LYNCH:

19 Q Again, Dr. Sternberg, we have the northwest corner there,
20 correct?

21 A Yes.

22 MR. LYNCH: And could you pull up the legend,
23 Julianne?

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 ///

1 BY MR. LYNCH:

2 Q And we see the -- again, the legend in green and the
3 green hash marks are estimated extent of contaminated soils
4 above remediation goals and soil excavation area, correct?

5 A Correct.

6 Q So again, that's EPA's estimate as to the area of the
7 contaminated soil, correct?

8 A Correct.

9 MR. LYNCH: Close that, please.

10 DOCUMENT TECHNICIAN: (Complied with request.)

11 MR. LYNCH: Let's go to Demonstrative DD151.

12 DOCUMENT TECHNICIAN: (Complied with request.)

13 BY MR. LYNCH:

14 Q In calculating your mass estimates, Dr. Sternberg, you
15 used a reconfigured area for the northwest corner of 2,600
16 square feet total, correct?

17 A That's correct.

18 Q This area here?

19 A Correct.

20 Q It's a little more than half of EPA's estimated extent of
21 the contaminated area?

22 A That's correct.

23 Q And that effectively reduces the mass of PCE, perc, that
24 you estimate to be in the northwest corner, correct?

25 A That's correct.

1 Q EPA is not just going to let Soco dig up that 2,600
2 square feet, are they, because that's what you say is
3 contaminated?

4 MR. CRANE: Objection. Lacks foundation.
5 Argumentative.

6 THE COURT: Overruled. This is cross.
7 You can answer.

8 THE WITNESS: I don't know what EPA is going to ask
9 Soco to do, they're going to ask Soco to do to clean it up.
10 But the green area is the estimated. There is no confirmation
11 how much they actually need to clean. That's an estimate.

12 BY MR. LYNCH:

13 Q All of these mass calculations are estimates, aren't
14 they, Dr. Sternberg?

15 A That's correct, but the area to be cleaned up is also an
16 estimate.

17 Q As is your mass calculation, correct?

18 A Sure.

19 MR. LYNCH: Please go to Exhibit 3058-0050.

20 DOCUMENT TECHNICIAN: (Complied with request.)

21 BY MR. LYNCH:

22 Q This is a page from the RI addendum.

23 In calculating your mass of the northwest corner soils,
24 Dr. Sternberg, you only took samples within that area,
25 correct?

1 A I only considered samples from that area? Is that what
2 you're saying?

3 Q In calculating the mass of the soils.

4 A I considered the data from this, plus whatever data is
5 adjacent to it. And we didn't find it.

6 Q You didn't consider the perc that's been found in that
7 area, did you?

8 A I'm sorry?

9 Q You didn't consider the perc that's been found in the
10 area that I've circled on the diagram, did you?

11 A That value was extremely small.

12 Q Do you recall what that value was, Dr. Sternberg?

13 A I'm sorry?

14 Q Do you recall what that value was, the one you said was
15 extremely small?

16 A I don't, but I can pull it up. What well was it?

17 Q PT-1. I believe it's 304 milligrams per kilogram.

18 A PT-1?

19 Q One.

20 A When was it taken?

21 Q There, you might have me.

22 Actually, Julianne, if you'd go to 3051? This is the RI
23 addendum, page 815.

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 MR. LYNCH: If you could pull out this area in here?

1 DOCUMENT TECHNICIAN: (Complied with request.)

2 BY MR. LYNCH:

3 Q We have results right above where I'm drawing the line,
4 Dr. Sternberg, for PT-1, 6 to 8 feet below ground surface
5 taken in 2001, 304 milligrams per kilogram. That's well
6 above --

7 A Yes, I don't -- I see it. I don't recall right now why
8 we did not consider this data point. That must have been -- I
9 can't remember right now why, but there was a reason why, why
10 I didn't include it.

11 Q And that data point is indicative of DNAPL perc, isn't
12 it, Dr. Sternberg?

13 A This one is, yes.

14 MR. LYNCH: You can take that down.

15 DOCUMENT TECHNICIAN: (Complied with request.)

16 MR. LYNCH: Go back to the ROD Figure 7, 3059-0121.

17 DOCUMENT TECHNICIAN: (Complied with request.)

18 THE WITNESS: I am sorry. I think we did --

19 BY MR. LYNCH:

20 Q Dr. Sternberg, just wait for the question, please.

21 A Well, let me correct myself. We did include it.

22 MR. LYNCH: Can you pull up, Julianne, Figure 8 to
23 Dr. Sternberg's expert disclosures in this matter?

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 MR. LYNCH: May I approach, Your Honor?

1 THE COURT: Yes.

2 BY MR. LYNCH:

3 Q (Hanging.)

4 A Right. What we did now, I recall. What we did is we did
5 not include it because we considered it to be, as the RI did,
6 as a separate area.

7 MR. LYNCH: Now go back to the ROD figure,
8 3059-0121.

9 DOCUMENT TECHNICIAN: (Complied with request.)

10 BY MR. LYNCH:

11 Q Am I correct, Dr. Sternberg, that after the RI, by the
12 time of the ROD, EPA has made this a contiguous source area?

13 A They did.

14 MR. LYNCH: Go back to Demonstrative DD151.

15 DOCUMENT TECHNICIAN: (Complied with request.)

16 BY MR. LYNCH:

17 Q Now, Dr. Sternberg, not only did you cut EPA's source
18 area in half this way, you cut it in half again that way,
19 didn't you, when you were determining mass?

20 A Yes. I looked at the two separate areas because there
21 are two separate sets of data there.

22 Q This, the side on the right has soil borings?

23 A Correct.

24 Q Because that's on Soco West property, and ATC could
25 conduct soil borings on that side, correct?

1 A I don't know if they could do borings only on one side or
2 on both sides. The fact is that there are no soil borings on
3 the west side.

4 Q So you just assumed, because there's no soil borings,
5 that the left side -- you understand this is the Keller
6 fenceline between those two, isn't it?

7 A Yes.

8 Q And I understand there's no soil sampling data from the
9 Keller side to tell us exactly what soil concentrations are
10 there, but EPA did not stop its estimated extent of DNAPL
11 contamination at the fenceline, did they?

12 A No. Neither did we. We attempted to calculate, as you
13 well know, what is the concentration in the soil in the light
14 blue area, and we came up with a number.

15 MR. LYNCH: Julianne, please go to RI addendum,
16 3058, page 50.

17 DOCUMENT TECHNICIAN: (Complied with request.)

18 BY MR. LYNCH:

19 Q Even in the limited area you considered, Dr. Sternberg,
20 EPA says that the half of that that's on the Keller side, this
21 side, is contaminated with DNAPL? That's what they've
22 estimated, isn't it?

23 A Yes.

24 MR. LYNCH: And go back to the ROD Figure 7,
25 3059-0121.

1 DOCUMENT TECHNICIAN: (Complied with request.)

2 BY MR. LYNCH:

3 Q And again, EPA has made no distinction, in its source
4 area, just because of the fenceline there, have they?

5 A No.

6 Q And yet, according to your calculations, you've assumed
7 that just because there's a fenceline there and we don't have
8 soil data on it, that the side on the Keller property is
9 completely different?

10 A No, I did not. If you can go back to the slide that
11 shows our Areas 1 and 2?

12 MR. LYNCH: Let's go to DD151, then.

13 DOCUMENT TECHNICIAN: (Complied with request.)

14 THE WITNESS: The area in yellow is an area for
15 which there are soil borings, and we have considered all of
16 those. The light blue area has no boring, has no soil data,
17 but it does have, I believe, four, three or four -- what are
18 those? -- DP wells. And some of those, or all of those -- I
19 don't remember right now. I have to look at my data sheet --
20 have pegged. And what we attempted to do is find out what is
21 the value of the perc in the soils in the blue area that
22 corresponds to information from those MP wells, and I believe
23 that we did it, and we came up with a number. We did not
24 ignore this area.

25 ///

1 BY MR. LYNCH:

2 Q You did not ignore the area, but according to your
3 calculations, Dr. Sternberg, if your estimates of the amount
4 of contamination in that area are correct, that area would not
5 be a DNAPL area, would it?

6 A The EPA has used various criterias to determine what is a
7 DNAPL area or not DNAPL area, and one of those was when the MP
8 well pegs, and three or four of those pegged, so EPA concluded
9 that it is a DNAPL area. Again, it's an estimate. But the
10 estimate does not have any quantitative numbers behind it.
11 It's only qualitative. And it's perfectly all right for an
12 estimate to be qualitative, but when one wants to calculate an
13 actual estimate concentration, you need hard numbers. You
14 can't simply go by estimates. And we have attempted to assign
15 real numbers to the light blue area, and we documented how we
16 did it. And, therefore, I feel very comfortable with our
17 analysis, as well as with EPA's estimate.

18 Q According to your analysis, Dr. Sternberg, there would --
19 the average concentration of PCE on the blue side of the fence
20 would be 44 milligrams per kilogram, correct, in the 5- to
21 14-foot range?

22 A I don't remember what the numbers are. I mean, I will
23 take your word for it, but I don't see it in here. Here, it
24 only shows the total gallons of PCE.

25 Q And that's far below what EPA has identified as a soil

1 NAPL indicator, isn't it?

2 A It is.

3 Q And the results of that is that just because there's a
4 fenceline on Keller property, you have about a tenth of the
5 volume of perc on this side as you do on the Soco side; isn't
6 that correct?

7 A No, the fence has nothing to do with it.

8 Can you show our Figure 7?

9 MR. LYNCH: Figure 7, Julianne.

10 DOCUMENT TECHNICIAN: (Complied with request.)

11 THE WITNESS: Okay. Can you blow it up?

12 DOCUMENT TECHNICIAN: (Complied with request.)

13 THE COURT: We can switch over to --

14 THE CLERK: Oh. Sorry.

15 DOCUMENT TECHNICIAN: (Complied with request.)

16 THE WITNESS: Now you can see where the fenceline
17 is, and you can see that west of the fenceline, there are four
18 MP wells: 122, 121, 120, and 119. None of these have any
19 data associated with them.

20 BY MR. LYNCH:

21 Q Soil data?

22 A Soil data. So how do we determine what is the
23 corresponding concentration to these particular wells?

24 Well, can I see our table, I believe it is, either 506?

25 (Pause.)

1 THE WITNESS: Can we?

2 MR. LYNCH: I'm not controlling it.

3 MR. JOHNSON: I think we --

4 THE WITNESS: Oh.

5 MR. LYNCH: We can cover this on redirect.

6 THE WITNESS: Pardon?

7 MR. LYNCH: Why don't we cover this on redirect.

8 BY MR. LYNCH:

9 Q Actually, let's do go back to that. The MIP locations
10 that you chose don't have soil data associated with them, do
11 they?

12 A That's correct.

13 Q So you chose soil data from other MIP locations?

14 A Well, what I tried to do is to find out some way of
15 correlating a value for an MP well that has pegged with those
16 locations where the MP well has pegged and there is some soil
17 data.

18 Q The EPA RI addendum states that MIP pegging, the soil
19 correlation is anywhere from 10 to 100 milligrams per
20 kilogram, doesn't it?

21 A I'm sorry?

22 Q Doesn't the RI addendum state that EPA -- that MIP
23 pegging correlates to soil concentrations of anywhere from 10
24 to 100 milligrams per kilogram?

25 A I have seen other numbers.

1 Q Not a very accurate correlation of soil data in that
2 particular MIP?

3 A That's correct. That's correct.

4 Q You didn't use the soil data from just across the fence
5 on the Soco side even though it's within 10 feet of these
6 samples, did you?

7 A Of course I did.

8 Q To determine what's on the Keller side?

9 A Sure.

10 Q Other than MP-138?

11 A We used MP-139.

12 Q But you didn't use any of the other soil samples?

13 A I'm sorry?

14 Q You didn't use any of the other soil samples on the Soco
15 side?

16 A We used MP-109, MP-139, MP -- well, if you show our
17 Table, I believe it's either 6 or 7, it lays out exactly which
18 wells we used.

19 Q What I'm getting at, Dr. Sternberg, though, is you didn't
20 use the soil samples that were within the DNAPL zone right
21 across the fence in calculating and estimating the
22 concentrations in soil on the Keller side?

23 A I can't use actual soil data concentration from a point
24 that is a hundred feet away from the point I'm looking at,
25 because if you look at the data itself in here, there's

1 enormous variability. There are some data points that are
2 5 feet apart and you get towards a magnitude of difference, so
3 I have no right of translating 500 or 200 feet distance, take
4 one point and move it 200 feet away. That will be absolutely
5 unacceptable. But what I can do is take the data that is
6 provided, namely the MP wells, and try to, to the best of my
7 ability, see what it translates to, and that's what, exactly
8 what I have done.

9 Q Let's look at some of the other aspects of your mass
10 calculations, Dr. Sternberg.

11 Now you've criticized somewhat other people's mass
12 calculations, but it's true in this case you've already
13 provided corrected versions of your mass calculations several
14 times; isn't that correct? Or at least one time?

15 A I don't know if it's several times. I remember one time
16 is we simply made an arithmetic error, and if you look at all
17 of the numbers, I don't think it's totally unreasonable to add
18 six numbers and skip one and come up with one that is a
19 different number. The total difference was, I believe,
20 something of 2 gallons, so we're not talking about some
21 horrendous error that we corrected. And as soon as I found
22 the error, we reported it. So there was nothing to hide.

23 Q Okay. And you've corrected it now? Your report is
24 correct, your estimate?

25 A I believe so.

1 Q Can we please pull up -- actually let me ask you
2 something about your report, and let's look at your corrected,
3 a corrected version of your report.

4 May I approach, Your Honor?

5 THE COURT: Yes.

6 BY MR. LYNCH:

7 Q (Hanging.)

8 A Thank you.

9 MR. LYNCH: Julianne, can you please pull up Table 2
10 of the corrections to Dr. Sternberg's report?

11 DOCUMENT TECHNICIAN: (Complied with request.)

12 BY MR. LYNCH:

13 Q I believe this is a groundwater calculation that you did;
14 isn't that correct, Dr. Sternberg?

15 A Just a minute.

16 Yes.

17 Q Okay. And one of the things you did in connection with
18 making your mass estimates is you determined the PCE
19 equivalent amount, I believe, for all of these various
20 breakdown products?

21 A Correct.

22 MR. LYNCH: And just so I'm sure I understand this,
23 Julianne, could you please pull up Demonstrative DD5?

24 DOCUMENT TECHNICIAN: (Complied with request.)

25 ///

1 BY MR. LYNCH:

2 Q And one of the things we discussed with Dr. Powell
3 yesterday, perc or PCE breaks down to trichloroethylene when
4 it loses a chlorine, essentially; loses a chlorine and breaks
5 down to either cis or trans dichloroethylene; loses a chlorine
6 and breaks down into vinyl chloride. Generally true?

7 A Yes.

8 Q Okay. So to come up with your estimate of perc, the
9 equivalent amount, you convert everything back to perc when
10 you're doing your analysis, correct?

11 A Yes.

12 Q And that end perc equivalent amount should be something
13 greater than the sum of the volume of these breakdown
14 products; is that correct?

15 A The sum of the volumes -- no, not necessarily. I mean,
16 when perc -- I may not understand your question.

17 MR. LYNCH: Let's go back to Table 2, Julianne. Can
18 you enlarge that, please?

19 DOCUMENT TECHNICIAN: (Complied with request.)

20 BY MR. LYNCH:

21 Q This amount is the volume you calculated for the TCE in
22 the groundwater, correct?

23 A Correct.

24 Q So the amount of perc that it would have taken to have
25 made that volume of TCE is something greater than 390,

1 correct?

2 A I don't know. I'll have to go back and take a look at
3 it, because it's a function of molecular weight, and the
4 molecular weight of PCE is greater than of TCE.

5 Q So the amount of PCE that it takes to make 3.9 gallons of
6 TCE should be greater than 3.9 gallons, correct?

7 A Not necessarily. I'll have to go back and calculate
8 these, because it's not -- as you can see, the molecular
9 weight of each one of those is less, is decreasing, so that
10 doesn't, doesn't necessarily mean that the volume itself is
11 going to be bigger. We are talking about constituents that
12 have different weights. We can't compare volume and volume.
13 You have to compare the actual mass of the material itself.

14 Q Do you recall your deposition in this case,
15 Dr. Sternberg?

16 A Yes.

17 MR. LYNCH: Do you have his transcript?

18 MR. BANKER: (Hanging.)

19 BY MR. LYNCH:

20 Q (Hanging.) Please go to page 116 --

21 A All right.

22 Q -- line 14.

23 And we're discussing this Table 2 in your report, aren't
24 we, Dr. Sternberg, there?

25 A Yes.

1 Q The question states, "Okay, and let me ask you this. If
2 you have like say a gallon of PCE, could the degradation
3 products of that gallon equal more than a gallon? It has to
4 be less than a gallon; isn't that correct?"

5 Your answer, "You can't create something from nothing."

6 Question, "Okay. So it has to be less than a gallon?"

7 Answer, "Absolutely."

8 Question, "The degradation products?"

9 Answer, "Sure."

10 So, Dr. Sternberg, on Table 2, when we add up all of
11 these volumes of the degradation products, we get a total sum
12 of 26.92.

13 A Correct. I clearly misspoke because, I mean, that -- you
14 cannot compare a gallon with a gallon. You cannot compare
15 these things on a volumetric basis. You have to compare it on
16 a mass basis. In other words, you cannot simply say that, for
17 example, a gallon of water and a gallon of gasoline are the
18 same, because they weigh differently, and, therefore, I
19 clearly misspoke in my deposition.

20 Q Well, maybe we'll have Dr. Powell explain it in rebuttal,
21 but, Dr. Sternberg, isn't it true you're creating something
22 from nothing there and underestimating the amount of perc in
23 all of your calculations?

24 MR. CRANE: Objection. Argumentative.

25 THE COURT: Sustained.

1 THE WITNESS: I don't think so. I mean, the bottom
2 line is that Dr. Powell and I agreed --

3 THE COURT: I sustained it.

4 THE WITNESS: Oh. Sorry.

5 MR. LYNCH: I have nothing further.

6 THE COURT: Redirect?

7 MR. CRANE: A few questions, Your Honor. Thank you.

8 THE COURT: Do you have any questions?

9 MR. GROSSBART: No, Your Honor.

10 MR. CRANE: If we could pull up Demonstrative 492, I
11 think it is?

12 DOCUMENT TECHNICIAN: (Complied with request.)

13 REDIRECT EXAMINATION

14 BY MR. CRANE:

15 Q Counsel was asking you about the difference between the
16 2,600 square feet that you used and the EPA's 5,600. Do you
17 recall that?

18 A Yes.

19 Q Is this demonstrative helpful to you to explain what you
20 did and why you did it in that regard?

21 A Yes. I mean, when EPA first came up with the RI, which
22 is the remedial investigation, and then the addendum to the
23 remedial investigation, they identified two separate source
24 areas, the one on the bottom, PT-1, and the larger area as two
25 separate sources because in between, in this area and here,

1 there are either no soil -- there are basically no soil data,
2 or, if you look at the data from PZ, I believe PZ-5, there
3 were very small concentrations. And, therefore, in EPA's mind
4 at that time, these two were separate areas, and, likewise,
5 when EPA drew this, they concluded that the area impacted by
6 perc in the northwest corner had an approximate area of
7 2,600 feet.

8 Between the issuance of the RI and the FS, no additional
9 data was collected in this area. When the EPA came up with
10 their estimate for the contaminated soil, they increased the
11 area quite a bit. And I believe we have a demonstrative that
12 shows the one over -- one overlays the other. Maybe we can
13 see it?

14 Q Well, let me just ask you this to crystallize what you're
15 talking about. In your view, is it scientifically valid to
16 assume data that doesn't exist?

17 A Absolutely not.

18 Q Why not?

19 A Well, because you are reporting, you are making a
20 calculation, and you need to have some data for this estimate.
21 If you have no data, you have absolutely no right to assume
22 that this data -- that this location has some contamination.
23 It may or may not, but you, you have absolutely no right to
24 assume that it has some.

25 MR. CRANE: Pull up D424, if you would.

1 DOCUMENT TECHNICIAN: (Complied with request.)

2 BY MR. CRANE:

3 Q Would this demonstrative help you explain your last
4 answer in terms of data being there or not there and its
5 utility in this case?

6 A Sure. I mean, if you look at this, this area looks like
7 Swiss cheese. I mean, they have punched holes all over the
8 place. And in many of the holes, they either did not collect
9 any samples because -- may very well have been that the field
10 screening suggested that there is no reason to send the sample
11 to the laboratory. Every time you send a sample to the
12 laboratory, somebody has to pay for it. That's why we do
13 field screening. We take a soil sample. We split it in two.
14 We analyze it in the field, and if the field analysis says
15 that there is little or no contamination, there is no reason
16 to send the soil out.

17 So the fact is that we have quite a bit of data, and I've
18 used whatever appropriate data there is in here. But if there
19 are no data in a certain area, you really have no right to
20 assume that there is contamination and proceed with the
21 estimate.

22 Q Given the Swiss cheese nature, would you tend to assume
23 the opposite?

24 A No.

25 Q You just couldn't assume one way or the other?

1 A I would only use the available data. If there are no
2 data, I will try to find out what is the equivalent data like
3 I was talking to Mr. Lynch. There are some MP wells, that the
4 only information we have is that those wells pegged, and I
5 attempted to find out what is the correlation between a well
6 that pegs and the soil contamination. I found information
7 about four wells, and that's the information that I've used in
8 my analysis.

9 Q All right. And is it your understanding that the EPA's
10 goal is to clean up and not necessarily quantify the amount of
11 contamination in the soil?

12 A That's correct. For estimating purposes, it's perfectly
13 all right to draw a line or to draw a curve, and you can draw
14 it at 5,600, and if they drew it at 5,700 or at 5,500, nobody
15 would argue with that because it is an estimate. But when you
16 come to estimate the amount of contamination in the soil, you
17 cannot rely on an estimate. You have to rely on the available
18 data.

19 MR. CRANE: Let's go back to Demonstrative 492 for
20 just a second.

21 DOCUMENT TECHNICIAN: (Complied with request.)

22 BY MR. CRANE:

23 Q And you see the extra little blob down here.

24 A Right.

25 Q Would counting that blob materially change your opinion?

1 A No.

2 Q And Mr. Lynch was, I guess, criticizing you about Table 2
3 in your report. Did Table 2 have anything to do with soil?

4 A No.

5 Q That was groundwater?

6 A Correct.

7 Q And you don't have any disagreement with Dr. Powell about
8 the amount of perc in the groundwater?

9 A That's correct.

10 MR. CRANE: Thank you, Dr. Sternberg.

11 THE COURT: You can step down.

12 THE WITNESS: Thank you.

13 THE COURT: Let's take another quick break here.

14 THE LAW CLERK: All rise.

15 (Recess taken from 15:54:35 to 16:10:14.)

16 (Open court.)

17 (Jury present.)

18 THE COURT: Please be seated.

19 Call your next witness.

20 MR. DAVIS: The insurers call Bruce Dale.

21 Witness sheet?

22 THE COURT: I don't need it.

23 MR. DAVIS: You don't need it? Okay. Thank you.

24 WHEREUPON,

25 ///

1 BRUCE EDWIN DALE, Ph.D.,
2 called for examination by counsel for plaintiffs, after having
3 been first duly sworn to testify the truth, the whole truth,
4 and nothing but the truth, testified as follows:

5 DIRECT EXAMINATION

6 BY MR. DAVIS:

7 Q Would you state your name, please?

8 A Bruce Edwin Dale.

9 Q Where do you live, sir?

10 A I live in Mason, Michigan.

11 Q What do you do for a living?

12 A I'm a professor of chemical engineering at Michigan State
13 University.

14 Q What is the academic field of chemical -- well, what is
15 the field of chemical engineering?

16 A Chemical engineering is that branch of engineering that
17 deals with taking raw materials and converting them by
18 chemical or physical means to things that are more useful,
19 more valuable. For example, crude oils that come out of the
20 ground really isn't good for very much, so we heat it, distill
21 it. We make gasoline, diesel fuel. You further process it.
22 You get plastics and paints and so forth. Or, for example,
23 trees coming out of the forest aren't really very much good
24 for writing on, but we process them and pulp them, and now you
25 have paper and other kinds of products. So any place where

1 there's raw materials being converted to more valuable finish
2 products by chemical processing, that's where you find
3 chemical engineers working.

4 Q How long have you been a professor of chemical
5 engineering at Michigan State?

6 A About 15 years.

7 Q As someone who is -- well, maybe we should first go
8 through your background.

9 What is the extent of your formal education?

10 A I received a bachelors and a masters degree in chemical
11 engineering from the University of Arizona; in 1976, I got the
12 masters degree. Then I went on to Purdue University to get
13 the Ph.D. or the doctorate and graduated there in 1979.

14 Q After graduating from Purdue, what have you done?

15 A I was first on the faculty at Colorado State University
16 down in Fort Collins for eight years; then the faculty at
17 Texas A&M University, also for about eight years.

18 Following that, I was offered the position of department
19 chair at Michigan State University, where I have been ever
20 since. Not always as department chair, but that's where I've
21 been ever since.

22 Q As someone who has apparently been teaching chemical
23 engineering for several decades now, have you become
24 acquainted, in that academic career, with the chemical
25 properties of perchloroethylene?

1 A Yes.

2 Q Have you served as an expert witness in lawsuits
3 involving perchloroethylene, or perc?

4 A Yes, I have.

5 Q What kind of cases, Professor Dale?

6 A Mostly they've been connected with perc contamination
7 around the operation of drycleaning facilities. That's where
8 most of it has been.

9 Q Are you -- you're appearing as an expert witness for the
10 insurers here, are you not?

11 A Yes.

12 Q You're being paid for your time?

13 A Yes.

14 Q Both in and out of court?

15 A Yes.

16 Q What do you charge for your time, sir?

17 A \$275 an hour for outside of court and \$400 for being
18 grilled here.

19 Q What were you asked to do in this case?

20 A I was asked to offer my opinions about what would happen
21 if a spill of hundreds of gallons of perc occurred in the
22 loading and unloading area there at Dyce Chemical.

23 Q Based upon your education, the training you've received,
24 and your experience as a professor of chemical engineering,
25 and specifically on your knowledge of the properties of perc,

1 do you have an opinion as to whether Soco's spill claim, which
2 it is advancing in this lawsuit, is at all plausible -- and
3 let me finish -- specifically, that there was a spill of
4 500 gallons of perc in the loading/unloading area of Dyce
5 Chemical in Lockwood in the mid 1970s, and that no one has
6 ever noticed such a spill?

7 A No, it's not plausible to me.

8 Q My question was, Do you have an opinion on this?

9 A Oh, sorry. Yes, I have an opinion.

10 Q And the opinion is?

11 A It just doesn't make any sense that you have a spill that
12 large and nobody notice it.

13 Q Are the known chemical properties of perc, did they enter
14 into the bases for your opinion?

15 A Yes.

16 Q And what are some of the known properties of perc upon
17 which you have formed your opinion?

18 A Well, some of them have been mentioned already, but, for
19 example, the density of perc. It's heavier than water, and so
20 it will sink in water. It's also not very soluble in water.
21 There's also a property we call viscosity, which just
22 basically means how runny it is; if you pour it, how far it
23 will spread out.

24 Q Maybe you better --

25 A Slow down?

1 Q I need to stop you there.

2 A Okay.

3 Q And you need to slow down.

4 A Okay. A little nervous. Sorry.

5 Q That's okay.

6 You mean, "how runny it is," can you give examples for
7 the jury of comparative runniness or viscosities of things
8 that they may encounter in their own lives?

9 A Sure. For example, ketchup, if you poured some ketchup
10 on a plate or on a table, it won't spread out very far.
11 Ketchup is not very vis- -- sorry. It's quite viscose. It's
12 quite -- it's not very runny. It's fairly thick. If you pour
13 water on the table, of course, it spreads out quite a bit.

14 Perc is even less viscose than water. That means it's
15 more runny. It will spread out further, and it will spread
16 out faster than an equal sized spill of water, so it will
17 spread out to a greater extent and will do it more quickly
18 than water would.

19 Q You mentioned weight. You mentioned viscosity. What
20 about the jury has heard the term that perc acts as a solvent.
21 Did you -- is that correct?

22 A Yes.

23 Q And did you take that property of perc into account in
24 reaching your opinion?

25 A Yes, I did.

1 Q And what do we mean when chemical engineers talk about a
2 chemical being a solvent?

3 A Well, when you talk about something being a solvent, it
4 means that it will dissolve or bring into solution something
5 else. For example, water is a solvent for sugar. It will
6 dissolve sugar. Perchloroethylene and water aren't solvents
7 for each other. They won't dissolve each other. But perc is
8 a very good solvent for things that are like it, like, well,
9 like grease and tar, and, as it turns out, the black part, the
10 tarry part of asphalt. It's a very good, a very good solvent
11 for those.

12 Q We'll get to that in a minute.

13 Another characteristic or property of perchloroethylene
14 that we've heard about is its volatility. Is that the
15 correct -- am I using the correct noun?

16 A Yes, you are.

17 Q All right. And what do we mean, what do chemical
18 engineers mean by "volatility" of a chemical?

19 A It just means how easily something evaporates, how
20 readily it evaporates at a particular temperature, how fast it
21 goes from a liquid to a gas or a vapor.

22 Q Let me shift your attention to the operation, your
23 knowledge of the operational area of the Dyce facilities in
24 the mid '70s.

25 And, Neil, if we could, have you -- first of all, have

1 you examined aerial photographs?

2 A Yes, I have.

3 MR. DAVIS: Could we look at Exhibit 5019?

4 DOCUMENT TECHNICIAN: (Complied with request.)

5 BY MR. DAVIS:

6 Q And do you recognize this aerial as the Dyce facility as
7 of November 4, 1975?

8 A Yes.

9 Q And what has been laid down in the operational area, the
10 loading -- first of all, could you show us where you
11 understand the loading/unloading area was?

12 A It's for solvents like perc. It was right here in front
13 of the drumming shed. Let's see if I did this right.

14 Q And what was that surface area at that point in time?

15 A It was asphalt.

16 Q I want to stop you right there and put your chemical
17 engineering cap back on.

18 What is asphalt?

19 A Asphalt consists of really two things. The first, which
20 is most of it, is just rocks, small gravel, or we call it
21 aggregate, but it's just small rock of the right size. The
22 rest of it, the black part that actually holds the gravel
23 together is called bitumen. That's the technical name, but
24 what it basically is is the bottoms, after we take crude oil,
25 make gasoline and diesel and so forth, what's left on the

1 bottom of the pot. Literally the bottom of the barrel.

2 Q At the refinery?

3 A Yeah.

4 Q The bottom of the pot at the refinery?

5 A Right. At the oil refineries, right.

6 Q And what is at the bottom of the pot?

7 A Well, it's bitumen. It's tar.

8 Q Okay. And so --

9 A Very high molecular weight hydrocarbons, to be more
10 technical.

11 Q And so 26th Street out here in front of the courthouse is
12 asphalt. What's involved in the process of taking the rocks
13 and the bitumen and making it into 26th Street?

14 A You heat up the bitumen, and you mix it with the rock,
15 with the aggregate, and then you spread it out, and then you
16 roll it down. Now you have, now you have an asphalt pavement.

17 Q What happens when perchloroethylene contacts asphalt?

18 A Perchloroethylene, or perc, is a good solvent for
19 bitumen, and just as soon as the perc contacts the asphalt, it
20 starts dissolving that bitumen, the black part of the asphalt.

21 Q And in its refined state, what color is perc?

22 A It's clear. It looks like water.

23 Q And on the assumption that -- so if we poured some
24 perchloroethylene, walked out on the street in front of this
25 courthouse and poured perchloroethylene out on 26th Street,

1 what would you anticipate happening?

2 A Well, the perc would immediately start dissolving some of
3 the -- it would depend on how much you poured and over how
4 much area, but perc would immediately start dissolving the
5 asphalt, but it's also evaporating. So the perc dissolves
6 some of the asphalt, and then, as it evaporated, that asphalt,
7 which isn't volatile, would go back down. You'd see very dark
8 black areas. If you poured a lot more, you might see puddles.
9 It's just depends.

10 Q On the assumption -- I think we both assumed that Judge
11 Cebull was not going to adjourn court and allow us to go down
12 and pour some perc on 26th Street. Have you prepared an
13 exhibit that you made that allows the jury to see the effect
14 of perchloroethylene on asphalt?

15 A Yes, I have.

16 MR. DAVIS: And, Neil, can we have the video?

17 DOCUMENT TECHNICIAN: (Nodded head affirmatively.)

18 BY MR. DAVIS:

19 Q First of all, when did you make this?

20 A May of last year.

21 Q All right. Where did you make it?

22 A It's in my garage.

23 Q In Mason, Michigan?

24 A In Mason, Michigan, right.

25 Q Who was present?

1 A Well, you were there, Mr. Grossbart was there, the
2 videographer, and, of course, myself.

3 Q All right. And before Neil starts, we'll have to start
4 and stop this. You've seen this video before, have you not?

5 A Yes.

6 Q And just so the jury and the judge knows, it doesn't last
7 but for a couple minutes, does it?

8 A Four minutes, I think, total.

9 Q All right. And what do we see there besides you?

10 A Well, just a little table where I've set up a couple jars
11 with asphalt, and I'm holding a bottle of perchlor- -- the
12 brown bottle there is perchloroethylene.

13 Q And what are these two black objects there?

14 A Well, that's chunks of asphalt.

15 Q Where did you obtain them?

16 A By the side of the road near my house.

17 Q All right. Shall we start the video now?

18 A Sure.

19 DOCUMENT TECHNICIAN: (Complied with request.)

20 BY MR. DAVIS:

21 Q You poured the perchloroethylene into a container. Is
22 there any magic to that particular container?

23 A It's just a plastic called -- from polycarbonates, so it
24 resists perc.

25 Q Easier to use than the big jar?

1 A Yes.

2 Q All right. What are you doing now?

3 A Holding up a chunk of the asphalt. It's about an inch
4 and a half, 2 inches cubed.

5 Q And what do you have there?

6 A That's a bottle of water, Aquafina.

7 MR. DAVIS: Let's stop it right there.

8 DOCUMENT TECHNICIAN: (Complied with request.)

9 BY MR. DAVIS:

10 Q What are you about to do?

11 A I'm about to pour some of the perc, the
12 perchloroethylene, directly onto the asphalt in that Mason
13 jar.

14 Q All right. And what should the jury look for?

15 A Well, what you'll see is immediately -- the perc is
16 white. It's clear. But it looks like water. Of course, it's
17 not water, but it has that same clear. You'll immediately see
18 the perc start to turn black.

19 MR. DAVIS: Start it, Neil.

20 DOCUMENT TECHNICIAN: (Complied with request.)

21 BY MR. DAVIS:

22 Q What's happening?

23 A The perc is dissolving some of the bitumen out of the
24 asphalt.

25 Q You're putting on a timer. What for?

1 A Just to give the jury an idea of how long it takes for
2 some of these things to happen.

3 Q Now what are you going to do next?

4 A Just holding it up so the people can see that the perc is
5 dark. It's black.

6 Q The second one, this is the one with the water on it?

7 A Right. The jury has already heard that perc is heavier
8 than water and not soluble, so the perc will go right through
9 water. This is what I'm showing you here. The perc is being
10 poured. It goes right through the water layer and starts
11 dissolving the asphalt chunk that's at the bottom there with
12 the water layer.

13 And so you see it turning black.

14 Q Same as the other jar?

15 A Yes.

16 Q Except it's covered with water?

17 A Right.

18 Q Rather than keep -- I think this is pretty static. What
19 are you going to do next?

20 A Well, next, at about two minutes, I'm going to put a lid
21 on the jar on the left, and the lid has got holes in it, and
22 I'm going to shake some of the perc that's got some dissolved
23 bitumen, some of the dissolved tar, over some rocks and then
24 over some building material, some wood and some polyvinyl
25 chloride, just to show you how it would stain. Because,

1 again, this perc is volatile, and it's dissolved this tar in
2 it, so when the perc evaporates, it leaves the tar behind and
3 would stain things black. I'm going to show you that.

4 There goes the lid.

5 Waited close to two minutes. And now --

6 Q What do you have in the baking jar, in the baking dish?

7 A There's gravel and some rocks and some chunks of
8 concrete.

9 Q And why did you pick those types of objects to put in the
10 baking dish?

11 A Just to show the jury that if perc that had dissolved
12 some asphalt into it -- I'm sorry, some bitumen into it,
13 flowed over gravel or rock, what you'd see is a lot of
14 staining, actually I think a lot more staining than this. And
15 then I'm pouring it over other kinds of building materials
16 that you might see there; for instance, the piece of 2 by 4,
17 the vinyl downspout -- I'm sorry, the aluminum downspout,
18 painted, and then the piece of vinyl siding.

19 Q And why did you, in relation to the alleged spill of
20 several hundred gallons of perc in the Dyce loading area that
21 Soco now wants to contend took a path out to the northwest
22 corner from the loading and unloading area sometime in the mid
23 '70s, why did you have those objects there?

24 A Right. If perc had spilled on asphalt and then dissolved
25 some of the tar, the bitumen out of it, and then flowed over

1 land like we've heard, what you would see was a lot of black
2 staining all the way down the path, because the perc was
3 evaporating, as Dr. Powell has testified. It's evaporating,
4 but it's leaving behind the tar that it's dissolved, so you
5 get this, basically a bathtub ring, kind of effect. You'll
6 see where the tar has been deposited as the perc evaporates.

7 Q While the video is still playing, I want to move on.
8 We're about done with it, with the video, but I think we can
9 talk over it, Professor Dale.

10 A Sure.

11 Q Let me return you to the subject of viscosity.

12 A Right.

13 Q And that's how easily and far something will spread if
14 you spill it?

15 A Yes. It's basically it's how well it resists flow.

16 Q All right. Do you understand that Soco here has posited
17 that this spill that no one has ever noticed in the loading
18 and unloading area may have involved 500 gallons of
19 perchloroethylene?

20 A Yes.

21 Q Something in that range.

22 Can you, as a chemical engineer, calculate how far a
23 500-gallon spill of perchloroethylene would spread?

24 A Yes, I can.

25 Q How do you do that?

1 A Well, you have to make some assumptions about what was
2 happening, but there are standard methods in our practice of
3 chemical engineering for calculating how far liquids will
4 spread. You need to know their viscosity, that we talked
5 about, the density and other things, but you can estimate how
6 far a given spill will spread out.

7 Q And what kind of assumptions do you make to engage in
8 that type of calculation?

9 A For this particular calculation, what I assumed was all
10 of the spill occurred all at once in one spot and then it
11 spread out. Then further I assumed that it occurred on a
12 surface that was level, or essentially level, and that it was
13 a surface that the perc wasn't interacting with, wasn't
14 dissolving; in essence, it would be concrete or some other
15 surface that perc didn't interact with.

16 Q What would be the effect of the interaction? Would it --

17 A It would tend to slow down, probably, the spreading
18 somewhat. The perc would dissolve and become less viscose --
19 more viscose, rather.

20 MR. DAVIS: May I get a demonstrative exhibit from
21 the corner, Judge?

22 THE COURT: Yes.

23 BY MR. DAVIS:

24 Q Can you see what I put up there, Professor?

25 A Yes.

1 Q You recognize that to be what?

2 A That's an aerial photo of the Dyce site.

3 Q And we see it's scaled at the bottom?

4 A Two hundred-foot scale.

5 Q All right. And I ask you, using the assumptions you just
6 did --

7 A Yes.

8 Q -- can you calculate the volume that would be filled by a
9 500-gallon spill of perchloroethylene?

10 A You mean the area rather than --

11 Q The area that it would encompass.

12 A Yeah. Yes, I can.

13 Q And what is it?

14 A It's about 67 feet, roughly the distance from this end of
15 the courtroom to that end of the courtroom.

16 MR. DAVIS: All right. May I approach the witness
17 to give him some more demonstrative aids?

18 THE COURT: Yes.

19 THE WITNESS: Yes.

20 BY MR. DAVIS:

21 Q And can you place that on the scale, on the loading area,
22 that calculated spill diameter?

23 A This is -- I guess it's 68 feet. So here is the loading
24 and unloading area, and a 68-foot diameter spill would spread
25 out like that.

1 Q All right. Just for the sake of taking into account the
2 range of Soco's posited, unnoticed spill, do you remember what
3 the upper and lower ranges were?

4 A Well, I think it's between 250 and 1,000 gallons for the
5 lower range and then the upper range.

6 Q All right. And how big a spill area would 250 gallons
7 entail, using the same assumptions?

8 A Yeah. A 250-gallon spill spilled in the
9 loading/unloading area, using my assumptions, would look about
10 like that.

11 Q All right. What about the 1,000-gallon spill? How big a
12 diameter would that be?

13 A It's roughly 96 feet in diameter. So a 1,000-gallon
14 spill would do that.

15 Q Now let me ask you -- why don't you get back on the
16 witness stand.

17 A Sure.

18 Q You can leave that.

19 Let me ask you a minute about your assumptions. You
20 assumed, what, a perfectly flat surface?

21 A Yeah, basically a flat surface, yes.

22 Q All right. Have you been to the Dyce site?

23 A Yes, I have.

24 Q Have you also seen other aerials?

25 And, Neil, could we pull up 5033?

1 DOCUMENT TECHNICIAN: (Complied with request.)

2 BY MR. DAVIS:

3 Q Can you see a spill there in the loading area --

4 A Yes.

5 Q -- or some kind of liquid?

6 A Yes.

7 MR. DAVIS: All right. And 5036.

8 DOCUMENT TECHNICIAN: (Complied with request.)

9 BY MR. DAVIS:

10 Q Do you see another spill there in a later photo?

11 A Yes.

12 MR. DAVIS: And, finally, 5042.

13 DOCUMENT TECHNICIAN: (Complied with request.)

14 BY MR. DAVIS:

15 Q All right. Based on your own site visit and the
16 examination of the aerial photographs, do you feel you were
17 being unfair or unreasonable to assume a level spill area?

18 A No.

19 Q Why not?

20 A Well, because as you would expect in a working area, it
21 is basically flat. You don't want to have a big slope where
22 men are using heavy equipment and moving things around. So
23 apart from a little bit of slope to drain off the water, the
24 site looks flat to me, and it is as I would expect it to be.

25 Q Do you have an opinion with a reasonable degree of

1 scientific certainty how much of the asphalt in the
2 loading/unloading area would have been impacted by a
3 500-gallon spill of PCE in the mid 1970s?

4 A I think all of it would have been.

5 Q What would have been seen after a 500-gallon --
6 500 gallons of perc had been spilled in the loading/unloading
7 area?

8 A You would see a darkening, changing of color of the
9 asphalt, more blackening. If perc had run over some of the
10 asphalt and actually dissolved some of the bitumen, the tar
11 out, you would see the aggregate exposed. So if the aggregate
12 was a lighter color, as a lot of the aggregate is, you would
13 see that, I'm sure, and it would look white. You would see
14 the exposed rock or the aggregate. And you would see puddles,
15 too. Sorry.

16 Q Why would you see puddles?

17 A Well, because any surface, any -- you know, basically any
18 pavement or parking lot, it's not a perfectly flat sheet of
19 glass. There's ruts and dips and valleys. And so wherever
20 there's a low spot, some of the perc will accumulate there.
21 And, you know, like, for instance, you see rain on a parking
22 lot or rain on pavement, you'll see water in the ruts and in
23 the low spots.

24 Q And what would be going on in those low spots?

25 A Yeah. Well, perc is a solvent, again, for asphalt. So

1 the perc at that spot is dissolving the black part, the tar
2 out of the asphalt. Really it's destroying the asphalt,
3 because what holds asphalt together is the stickiness of the
4 tar holding the rock together, the aggregate together. If you
5 destroy that, if you break apart that, then the asphalt is
6 just basically a collection of small rocks, and it doesn't --
7 it loses its physical strength.

8 Q And I forgot to ask you this. A 500-gallon spill, how
9 much does that weigh?

10 A It's a little short of -- it's about 3.4 tons, a little
11 short of three and a half tons, but right at 3.4 tons.

12 Q So that weight of perchloroethylene in that area, what,
13 is that going to exacerbate? Is it going to make it less
14 noticeable than what you've just described?

15 A Well, it's just, it's just a really big spill. This is
16 not a small amount of stuff. We're not talking a gallon.
17 We're talking hundreds of gallons. We're not talking, you
18 know, a few pounds. We're talking almost three and a half
19 tons. It would really, really affect the asphalt.

20 Q Have you personally seen a spill of any substantial
21 volume of perchloroethylene on asphalt in conditions similar
22 to the Dyce loading/unloading area in your work as a chemical
23 engineer?

24 A I haven't seen, personally, but I've seen pictures of
25 one.

1 Q Are you aware, then, of such an event having occurred?

2 A Yes, I am.

3 Q Can you explain?

4 A A friend of mine, Mr. Elden Dickinson, who works for the
5 Michigan Department of Environmental Quality --

6 MR. LYNCH: Object as foundation, Your Honor. This
7 is foundation and hearsay.

8 THE COURT: Overruled. He's at least put on the
9 stand as an expert.

10 THE WITNESS: A friend of mine, a Mr. Elden
11 Dickinson, who is a -- who worked with the Michigan Department
12 of Environmental Quality, he was -- he actually had
13 responsibility for inspecting drycleaners for their compliance
14 with environmental standards. And about 20 years ago, he was
15 conducting an environmental visit, an environmental audit of a
16 drycleaner there in my home area of Michigan when a fellow
17 came in the door who was going to deliver perc to the
18 facility, and he was saying, yelling, "My perc is leaking from
19 my truck. I need help. Help me. I've got a big leak going
20 on."

21 BY MR. DAVIS:

22 Q And was Mr. Dickinson able to memorialize this event with
23 photographs?

24 A Yes, he was.

25 Q And were you able to obtain those photographs?

1 A Yes.

2 Q Do those photographs support what you've just told the
3 jury? Are they consis- -- or do they not support what you've
4 just told?

5 A No, they absolutely support what I've just told you.

6 MR. DAVIS: Neil, would you please pull up
7 Exhibit 4313, page 11?

8 This is being offered for demonstrative purposes,
9 Judge.

10 THE COURT: Yes, illustrative purposes.

11 MR. DAVIS: Illustrative.

12 BY MR. DAVIS:

13 Q Is this one of the photographs of the spill that
14 Mr. Dickinson related to you?

15 A Yes.

16 MR. DAVIS: And I offer it for illustrative
17 purposes, Judge.

18 THE COURT: It's admitted for illustrative purposes.

19 MR. DAVIS: All right.

20 BY MR. DAVIS:

21 Q And what do you see here, Bruce, that you believe is
22 consistent with what you've just told the jury?

23 A Well, three things, I think, are important for you to
24 see:

25 One is that the perc has spread out quite a bit. You see

1 a lot of asphalt affected.

2 The second is that, so -- and the second is the really
3 pronounced color difference between the asphalt pavement
4 that's had perc contact, or just the dark part of the pavement
5 and the other pavement that hasn't had any perc contacted with
6 it.

7 And the third place -- third thing is the puddles or the
8 pools where there's low spots in the pavement and the perc
9 accumulated in those low spots.

10 MR. DAVIS: There's another photograph that
11 Mr. Dickinson took. Can we see page 16 of that same exhibit?

12 DOCUMENT TECHNICIAN: (Complied with request.)

13 BY MR. DAVIS:

14 Q What do we see here?

15 A Mr. Dickinson called the fire people, and they came
16 quickly. I don't know how quickly, but they came, and one of
17 the firemen actually stepped in a piece of the asphalt that
18 had been attacked by the perc, and that's a picture of his
19 boot mark there. So as I mentioned, the perc will attack and
20 destroy the strength of asphalt. It just destroys it.

21 Q Let me direct your -- change the topic to the one of
22 volatility. And again, that's, what, how quickly it
23 evaporates?

24 A Yes.

25 Q Have you had your own -- you obviously haven't had the

1 personal experience with seeing the spill on asphalt. Have
2 you had any personal experience sampling the volatility of
3 perchloroethylene outside of a laboratory setting?

4 A Yes, I have.

5 Q Can you explain that to the jury?

6 A As I mentioned earlier, a lot of my work with perc has
7 involved drycleaners, so I've actually visited drycleaners --
8 not the front of the shop, back where they do the clothing
9 cleaning -- to see how the equipment operated, and I've had
10 some close encounters with perc back in those, in that kind of
11 environment.

12 Q While we still have the picture up, and I forgot to ask
13 you this, do you know how big a spill Mr. Dickinson was
14 dealing with in those pictures?

15 A Yeah. He believed -- it was never really accurate. He
16 believed it was less than 150 gallons, and that's consistent
17 with what we've heard. When people deliver perc to
18 drycleaners, they take out -- this is essentially a skid tank,
19 also, apparently about the same size, but we don't know
20 whether that tank was full, but it was less than 150 gallons.

21 Q All right. So what the jury saw in that other picture,
22 the earlier picture -- there it is -- that represents
23 something less than, approximately a third, perhaps, of the
24 hypothesized 500-gallon spill at the Dyce facility?

25 A That's only one piece of this spill, because that's one

1 photograph. There's other parts of it.

2 Q All right. Let me go back to volatility again. Your own
3 personal experience, what did you experience?

4 A Well, I was working with what's called a still, which is
5 the piece of drycleaning equipment that takes dirty perc
6 that's cleaned your clothes. So when you go to a drycleaners,
7 that characteristic smell you have, that's usually the smell
8 of perc. And I was working with a piece of equipment called a
9 still that evaporates the perc to clean it up so that it can
10 be reused, and I was working with the lid open off this still,
11 and I got too close to it, and I got a face full of the vapor,
12 the perc vapor.

13 Q And what was the effect on you?

14 A I couldn't continue working. My eyes started running
15 really fast. My nose started running, and I had real
16 shortness of breath. I had to get out of there for a while to
17 recover so that I could go back and do the work. It took me
18 20 or 30 minutes until I was able to go back, but my eyes were
19 burning. I could hardly see. My nose was run-, my nose was
20 running. It wasn't very pretty. And I -- the real shortness
21 of breath from catching a face full of it.

22 Q Does the volatility of perc have anything to do with
23 whether it's heavier or lighter than air?

24 A Yes, it does.

25 Q Can you explain that, Professor?

1 A Perc, liquid perc is heavier than water, so it sinks to
2 the bottom of water, as you're just seeing. Perc vapors are
3 also heavier than air, so when perc evaporates, the perc
4 vapors, as they evaporate, will push air out of the way.
5 They'll push it up, so you get a greater and greater
6 concentration of perc as stuff evaporates close to the ground.

7 Q Can you calculate the size of an area in which a specific
8 size spill of perc can be noticed?

9 A Yes.

10 Q How do you do that?

11 A Well, most people can smell perc when it's at a
12 concentration of about 50 parts per million. That's 5/1000ths
13 of 1 percent. Or just to give you a little comparison, we all
14 know what a percent is, 1 out of a hundred. So one penny out
15 of a dollar. A hundredth of that is you take that penny and
16 you divide that up into a hundred pieces. Now you take half
17 of that. That's the comparison of how much we can smell. So
18 we can really smell perc down to pretty low levels.

19 Q So if we posit, again, a 500-gallon spill of perc, how
20 big a sphere would that be in which that amount of perc would
21 be noticeable?

22 A If you assume that all of the perc evaporated at once and
23 so it filled up this area, basically a bowl, that bowl would
24 be about 1,000 feet across. So roughly in the area of
25 1,000 feet, or within a distance of 1,000 feet, people could

1 be able to smell the perc.

2 Q All right. Well, wouldn't that be affected by wind?

3 A Yes, sure.

4 Q Well, you understand the wind blows in Billings, don't
5 you?

6 A Yes, I know.

7 Q All right. Is there anything about the Dyce operational
8 area which affects the reasonableness of this
9 1,000-foot-sphere assumption which you've made?

10 A Well, the prevailing winds here in Billings, if I
11 understand right, are from the south, southwest, and the west.
12 It turns out that the unloading area, loading/unloading area
13 is shielded pretty much from those kinds of winds.

14 MR. DAVIS: Neil, could you pull up 3674? I think
15 there is no objection to it. 001, yeah.

16 DOCUMENT TECHNICIAN: (Complied with request.)

17 BY MR. DAVIS:

18 Q Is that what we're looking at?

19 A Yes. Yes, it is.

20 Q So what was your point about it?

21 A Well, just that a spill on the ground there, because
22 that's a pretty enclosed area, winds coming from the south,
23 the west/southwest, wouldn't be able to get back in the
24 loading and unloading area very well. It's pretty shielded
25 back there.

1 Q Well, let's assume that, consistent with the spill
2 hypothesis that Soco advanced here, that the spill occurs when
3 nobody is around that loading and unloading area for some
4 period of time. Do you have an opinion with a reasonable
5 degree of certainty as whether a spill of 500 gallons would go
6 unnoticed anywhere in the Dyce facility?

7 A Yes, I do have an opinion.

8 Q What's your opinion?

9 A I don't see how people wouldn't know that you'd spilled
10 500 gallons of this chemical out there, because you have the
11 air intake, you know, from -- there's the office building
12 right next, right next to the unloading area. You have the
13 air intake to bring fresh air into the building. It's going
14 to be picking up some of that perc, and they'll smell it
15 inside, too.

16 Q Do you understand that Mr. Hallsten has said how he
17 discovered the perc inventory shortage?

18 A No, I don't recall.

19 Q Well, all right. Let me ask you this. Do you understand
20 how big a storage container for perchloroethylene Dyce had in
21 the mid 1970s?

22 A Yeah. It was around 1,500 gallons.

23 Q All right. And do you understand what -- how perc was
24 unloaded at Dyce?

25 A Yes.

1 Q What, what's your understanding?

2 THE COURT: This is cumulative, isn't it?

3 MR. DAVIS: What?

4 THE COURT: This is cumulative, I said.

5 MR. DAVIS: Well, I don't think so, Judge, but I --

6 THE COURT: How it was unloaded at Dyce?

7 MR. DAVIS: Well, I think I need --

8 THE COURT: Haven't we heard that time and time
9 again?

10 MR. DAVIS: The sequence -- not the pumping but the
11 which came first. The drums -- what I want to get to is that
12 it was partially stored in tank and partially drummed.

13 THE COURT: That's cumulative.

14 MR. DAVIS: All right.

15 BY MR. DAVIS:

16 Q Well, let me ask you, Professor Dale, subject to the
17 judge's admonition. Does that -- can you -- do you have an
18 opinion with a reasonable degree of scientific certainty as to
19 whether perc could be spilled and still unloaded?

20 A No, I don't think anybody could continue to work in an
21 area where you had 500 gallons, anywhere near that size, of a
22 perc spill. They just, they just couldn't continue to
23 function.

24 Q Could they continue -- do you know how many drums they
25 would have to fill after filling a 1,500-gallon tank to

1 offload 3,000 gallons?

2 A Yeah. If they've already offloaded 1,500 gallons and
3 they're receiving 3,000, that means another, you know,
4 1,500 gallons, so that's another 30 drums, roughly.

5 Q All right. And can you, can you imagine any
6 circumstances where that drumming activity could continue in
7 the loading/unloading area after 500 gallons had been spilled?

8 A No.

9 Q Why?

10 A Well, just based on my experience. There's at least two
11 reasons:

12 One is that the perc is destroying the asphalt so that
13 the -- even if the perc -- the worker could continue to work
14 there, they're sinking down into this soft asphalt.

15 And, second, more importantly, you can't function.
16 People literally get drunk or intoxicated on a certain level
17 of perc at about 200 to 500 parts per million, and then you
18 pass out, and that person would probably fall in the pool of
19 perc and die. You could not continue to function. You just
20 couldn't do it.

21 Q Okay. And lastly, you understood how perc was
22 delivered --

23 A Yes.

24 Q -- to the operational area.

25 How?

1 A Well, it was delivered in these large trucks.

2 MR. DAVIS: Can you, Neil, pull up 5038, please?

3 DOCUMENT TECHNICIAN: (Complied with request.)

4 MR. DAVIS: All right. Can we blow the loading area
5 up, please?

6 DOCUMENT TECHNICIAN: (Complied with request.)

7 BY MR. DAVIS:

8 Q Something like what you and the jury can see in 5038?

9 A Yes.

10 Q All right. Assuming a 500-gallon spill of perc in the
11 loading area where that tanker truck is parked in 5038, what
12 would happen to the truck?

13 A Well, perc attacks the rubber of the truck tire -- of the
14 rubber, also, so perc spilled in that area would almost
15 certainly start contacting the rubber of the tires and start
16 destroying the tires. But, second, again, I mentioned perc
17 will attack the asphalt and destroy its integrity. That truck
18 probably can't get out of there afterwards because the asphalt
19 is gone. If it could, if it actually managed to get out of
20 there after the spill, it would leave huge ruts that, again,
21 would certainly be noticed by people.

22 Q So can you imagine any set of circumstances where 250 to
23 1,000 gallons of perc could be spilled in that loading and
24 unloading area and nobody ever notice it?

25 A No. I just can't. I just can't accept that. I can't

1 believe it.

2 MR. DAVIS: Thank you. Nothing further.

3 THE COURT: You may cross.

4 CROSS-EXAMINATION

5 BY MR. LYNCH:

6 Q Good afternoon, Dr. Dale.

7 A Hi, Mr. Lynch.

8 Q Dr. Dale, when did you visit the Dyce site?

9 A It was in August of last year, late August.

10 Q You have no personal knowledge of how this site looked in
11 the 1970s time frame; is that correct?

12 A That's right.

13 Q Have you ever seen chemicals being unloaded from a bulk
14 tanker truck?

15 A No, I haven't.

16 Q Aside from the pictures and the story you heard
17 secondhand from Mr. Dickinson, have you ever seen a perc spill
18 on asphalt?

19 A No, I haven't.

20 Q Of any size?

21 A No, I haven't.

22 Q What's your specialty at Michigan State?

23 A My research is what we call biochemical engineering.
24 Actually I do alternative fuels.

25 Q Isn't it true all of your experience dealing with matters

1 involving perchloroethylene are as an expert witness or
2 consultant?

3 A Apart from my undergraduate training in chlorinated -- or
4 basically that's true, yeah. So fundamentally, you're right.

5 Q I'd like to go through a few of the assumptions you made
6 for your calculations that form the basis of your opinion.

7 Regarding the spread assumptions, first, you assumed a
8 perfectly level surface.

9 A Yes.

10 Q A surface that didn't interact with perc?

11 A That's right.

12 Q So not asphalt.

13 A That's right.

14 Q Instantaneous release, I believe you said?

15 A Yes.

16 Q All at once?

17 A All at once.

18 Q How about temperature? Did you assume a temperature?

19 A Yes, I did.

20 Q And what was that temperature?

21 A About 75 degrees Fahrenheit.

22 Q And now your vapor calculations, you again assumed -- was
23 that another 500-gallon release?

24 A I'm sorry?

25 Q For your vapor calculations, a 500-gallon release?

1 A I am not sure what you mean by "vapor calculations."

2 Q When you calculated the 1,000-foot dome or hemisphere.

3 A No, I think that was the 250-gallon release.

4 Q The 250-gallon release?

5 A Yeah, if I recall correctly.

6 Q And what was the wind speed that you assumed for that?

7 A For the release for the vapor calculation?

8 Q Yes, for the vapor.

9 A No wind speed at all.

10 Q No wind speed.

11 A Right.

12 Q What was the evaporation rate you assumed for that?

13 A Well, I calculated an evaporation rate. I didn't assume
14 it. That was actually the point of the calculation, was to
15 get how fast the perc would evaporate, but I don't recall. It
16 isn't something that I've worked to prepare for for this case.

17 Q To smell the perc, wouldn't it have to evaporate?

18 A Yes.

19 Q And how quickly did you assume it evaporated to fill your
20 hemisphere?

21 A Well, that it starts evaporating immediately. I'm sorry;
22 I assumed that all of it evaporated immediately.

23 Q So you assumed it all evaporated instantaneously?

24 A Right, all 250 gallons evaporated immediately.

25 Q Is that even possible?

1 A No, it's not.

2 Q I believe you said perc is viscose, correct?

3 A No, I said it wasn't very viscose.

4 Q Or wasn't. I'm sorry. It wasn't very viscose?

5 A Yeah. It's nonviscose, yes.

6 Q That means it's runnier than water?

7 A Runnier than water.

8 Q Heavier than water?

9 A Yes.

10 Q It will flow downhill?

11 A Yes. All fluids flow downhill.

12 Q Further and faster than water?

13 A Yes. I guess I better add to that; of course, like
14 water, depending on what the hill is made of. You know, it
15 can be sinking in as it's flowing downhill.

16 Q Assuming that perc is -- assuming the surface the perc is
17 spilled on has a particular drainage direction, the perc will
18 follow that drainage direction, will it not?

19 A Well, all fluids would follow general drainage direction.
20 They would also spread out.

21 Q Will perc interact with concrete?

22 A No, not much.

23 Q Will perc interact with wood?

24 A It will soak into wood a little bit, but it doesn't
25 really interact with it much.

1 Q I believe you said you calculated an evaporation rate in
2 connection with your work in this matter; is that correct?

3 A Not with my work in this matter.

4 Q Not with your work in this matter.

5 I have no further questions.

6 A Thank you.

7 MR. DAVIS: Briefly?

8 THE COURT: Real brief.

9 MR. DAVIS: Very brief.

10 REDIRECT EXAMINATION

11 BY MR. DAVIS:

12 Q You assumed, for the sphere calculation, that the perc
13 all evaporated at once.

14 A That's right.

15 Q It doesn't evaporate all at once?

16 A No, it doesn't.

17 Q So would the odor linger over assumedly a smaller area?

18 A Yes, for a longer time.

19 MR. DAVIS: Thank you. That's all.

20 THE COURT: Thank you. You can step down.

21 Ladies and gentlemen, we'll be in recess, 8:30 in
22 the morning.

23 I give you the usual admonition. Don't talk amongst
24 yourselves. Don't talk to anybody. Keep an open mind.

25 We'll see you at 8:30 in morning.

1 (Jury not present.)

2 THE COURT: Be seated.

3 How many more witnesses do the insurers have?

4 MR. JOHNSON: Your Honor, we have only a short
5 video. I think it's about 17 minutes, and we were going to
6 call David Nanzig, but I understand that there is a motion
7 that has been filed today by the other side. In fact, there
8 are a couple of competing motions, Your Honor.

9 THE COURT: Yeah. Yeah, I thank you for it, too. I
10 don't have anything else -- you know, I like to read these
11 things at night.

12 MR. JOHNSON: Yeah. We tried to give you good
13 reading material.

14 THE COURT: Yeah, I know you have.

15 All right. On Soco's motion on Nanzig, I guess the
16 question is, What does "or can be reasonably anticipated"
17 mean? Now I can't -- where is my order of December 11, 2006?

18 THE LAW CLERK: Where is it?

19 THE COURT: I've been looking for it up here. I
20 thought I had it.

21 (Discussion off the record.)

22 THE COURT: Let's not talk about this for a minute
23 until I see this. Go get me one.

24 Let's talk about the insurers' motion to exclude
25 Hargis and limit rebuttal expert testimony of Robert Powell.

1 Here are my notes in reading this brief.

2 I had read the Soco brief first, because I got that
3 first on the motion *in limine* to limit or preclude testimony
4 of David Nanzig, but I need to see my order first.

5 On Hargis and Dr. Powell, again, now as I recall,
6 Dr. Powell started to testify at approximately 4 p.m. one day
7 and ended at approximately 4 p.m. the next day. Am I wrong on
8 that recollection?

9 MR. LYNCH: No, Your Honor.

10 THE COURT: I can't remember the days. They all
11 seem to run together. I know it wasn't Saturday or Sunday.

12 First, as to Dr. Powell, rebuttal, as I said the
13 last trial, rebuttal is rebuttal. I don't want to hear a
14 rehash of expert testimony. The way I view these kinds of
15 trials, you can have an expert in a particular area. One
16 expert. Anything more than one saying the same thing is
17 cumulative. That rule stands whether it's direct examination,
18 as I've just alluded to, and it stands certainly for rebuttal.

19 Now when you put the same expert back on the stand,
20 as Dr. Powell, after he's testified, you run the risk of
21 having the testimony be cumulative, especially if he's
22 testified over a whole day of court and he has anticipated or
23 maybe not personally addressed the opinions of the defense
24 experts in this case, the insurers' experts, but he has
25 addressed them.

1 As I understand it, if Dr. Powell himself is called
2 back as a rebuttal expert, he can't reiterate his own
3 opinions. The only opinion that, as far as I'm concerned, the
4 only opinion that Dr. Powell has not discussed is his, I
5 assume, his particular agreement with 80 gallons.

6 Now the insurers' position is that since Dr. Powell
7 gave an opinion that the size of the spill was, as I recall,
8 200 to 300 gallons, something like that, that he can't rebut
9 Dr. Sternberg's position that it's only 80 gallons and that he
10 was wrong. As far as I'm concerned, that is proper rebuttal,
11 but that's the only thing that Dr. Powell -- he can't get up,
12 again reiterate his position as to the amount of the spill and
13 how he arrived at it.

14 Apparently in the rebuttal report, Powell identified
15 three of Shanahan's opinions with which he disagrees: Soil
16 and water contamination is widespread throughout the Dyce
17 facility. The pattern of contamination along the ditch is
18 inconsistent with historical release of perc. And the pattern
19 of contamination in the northwest corner is consistent with
20 the release of fluids from the former pond.

21 As far as I'm concerned, Dr. Powell has already
22 testified that the soil and groundwater contamination is not
23 widespread. He's already testified the northwest corner is
24 limited to pure perc while other areas of the Dyce property
25 have other chemicals in addition to the perc. He even had the

1 pie chart. The pattern of contamination along the ditch is
2 inconsistent with a historical release of perc into these
3 areas. In his direct testimony, Dr. Powell discussed
4 Borehole F, how its finding supported his opinion that it
5 traveled along the ditch, arrived at the northwest corner.
6 Also on direct, he testified the absence of the perc in the
7 subsurface area surrounding the ditch is due to the fact that
8 evaporation prevented the perc -- he can't testify to any of
9 those things. And I will sit here and, if there's a venture
10 into a reiteration of his testimony, you people will object,
11 and I will rule.

12 Now as far as Mr. Hargis -- and I don't know if it's
13 Dr. Hargis or Mr. Hargis.

14 MR. LYNCH: It's Dr. Hargis, Your Honor.

15 THE COURT: Okay. Doctor. He also supposedly is
16 going to refute Shanahan's opinion there is widespread
17 contamination throughout the Dyce site. If you would have put
18 Hargis, Dr. Hargis on to testify to that, he would have been
19 cumulative to Dr. Powell. Powell stated the opinion that the
20 most likely explanation for the contamination in the northwest
21 corner is a large spill of a bulk-size quantity, and the
22 insurers' brief sets forth the trial transcript and the pages.

23 MR. LYNCH: Your Honor, Soco is not intending to
24 call Dr. Hargis at this point. The opinions that he was going
25 to rebut, some of them haven't been offered.

1 THE COURT: Oh, you're not going to have him at all?
2 Then I will shut up.

3 Now let's get to your motion on -- first, when the
4 time comes, I'm going to deny the insurers' motion for a
5 directed verdict, I am sure as you've all contemplated.

6 Second, I'll give instructions on notice, and as
7 I've ruled previously, I will give instructions on prejudice
8 and the requirement that you have to prove prejudice.

9 But I'm looking for -- I've issued so many orders in
10 this case that I can't recall. I doubt if I'd been able to
11 recall them 20 years ago.

12 The question I'm going to have is -- and maybe I
13 covered it in this order. I haven't had a chance to read
14 it -- what does it mean under the term, you have to have
15 knowledge of the accident and the property damage, or at least
16 damage that you could "reasonably anticipate"? What is the
17 meaning of that?

18 If "reasonable anticipation" includes the fact that
19 this alleged spill occurred in 1975, '76, or '77, and I think
20 at some point after the EPA investigation and coverage was
21 denied, the inventory shortages were developed in this case,
22 the question is, Can the insurers bring in evidence from the
23 date of the alleged spill clear up to the time they received
24 notice? And, if they are, then they can put in evidence of --
25 I assume that's what they would be attempting to do, put in

1 evidence of how they were prejudiced in the sense that had
2 they been told of the spill, in the event that this kind of
3 damage could have reasonably been anticipated, that they would
4 have had the ability to, I don't know, attempt to remediate it
5 or go make determinations. But I assume that's what is
6 purported in this Nanzig testimony, right?

7 MR. JOHNSON: That is correct, Your Honor.

8 THE COURT: Have we briefed this issue?

9 MR. BANKER: Well, I think there are a couple
10 concerns with Mr. Nanzig, and Soco has filed a brief to
11 preclude the testimony of Mr. Nanzig, but it takes us more
12 fundamentally back to, as a first issue, on Nanzig, as to
13 USF&G, USF&G has waived the defense of notice or prejudice by
14 not raising it in its reservation of rights letters. The
15 first time that USF&G --

16 THE COURT: I ruled against you the last time,
17 didn't I?

18 MR. BANKER: Pardon me?

19 THE COURT: Didn't I rule against you on that issue
20 in the last case?

21 MR. BANKER: I don't believe that that issue was
22 explicitly ruled on.

23 THE COURT: I gave an instruction on notice to the
24 jury, didn't I?

25 MR. JOHNSON: You did indeed, Your Honor.

1 THE COURT: Well, then, that means I ruled against
2 you.

3 Go ahead.

4 MR. BANKER: To the extent that Mr. Nanzig would
5 testify, the concern is consistent with the instructions that
6 were given last time on notice that if notice is notice when
7 you can reasonably anticipate a claim, there's no evidence in
8 this case whatsoever that there was any property damage that
9 Soco was aware of to third parties really until the claims
10 were made in 2000. But even if you made the argument from the
11 Lockheed Martin report in 1999, there is no way that
12 Mr. Nanzig ought to be able to testify about the 1970s, the
13 1980s, and the 1990s, to talk about notice and prejudice.

14 THE COURT: Let me stop you there.

15 You say there's no evidence in this case whatsoever
16 that there was any property damage that Soco was aware of to
17 third parties really until the claims were made. I think
18 actual notice, that's true. When the spill happened, could
19 you or should you have reasonably anticipated the claims?

20 MR. BANKER: There's no evidence in the record that
21 would suggest there's any reasonable anticipation of damage to
22 third-party property.

23 THE COURT: Well, they're talking about -- experts
24 talked about, even the last expert talked about the smell, the
25 damage that would have occurred to the asphalt, that kind of

1 thing.

2 MR. BANKER: Sure.

3 THE COURT: Isn't that a jury issue?

4 MR. BANKER: I don't think so, Your Honor. I mean,
5 the groundwater here that's at issue that's being complained
6 of in terms of coverage, I mean, this is not a property damage
7 claim that Soco is making.

8 THE COURT: I know. This is a liability policy.

9 MR. BANKER: And so you have a unique situation with
10 the groundwater, you know, and that goes back to the Montana
11 Constitution about who owns the groundwater and whose rights
12 you have.

13 THE COURT: Let's not get into that.

14 MR. BANKER: Even if we assume a spill occurred and
15 got down to the northwest corner, there's no evidence in the
16 record to suggest any knowledge that that would have done
17 anything other but, you know, but been a release of product,
18 Soco's product, onto Soco's land. So without some evidence to
19 go beyond that, there's really no reason to be able to draw
20 that back from, you know, 1999 further. And I guess --

21 THE COURT: Let me interrupt you.

22 Doesn't the fact that you're now claiming that there
23 was this spill, release, escape of perc in 1975, 1976, or 1977
24 that flowed down there that is now the cause of all of this,
25 because of the fact that you're making the claim, doesn't that

1 make this relevant as to whether a claim should have been
2 reasonably anticipated? And you all claim, and your position
3 is, you had no idea it was out there until after the EPA came
4 in and then the ROD was issued and then claims were asserted.
5 It wasn't even then that you claimed that there had been a
6 spill. I mean, how long could you have waited to assert that
7 there was this inventory discrepancy that must have resulted
8 from the spill?

9 MR. BANKER: Well, it's not so much the question of
10 at what point was the inventory issue to be raised with the
11 insurance company. You had a 1999 Lockheed Martin report that
12 first suggested that there was a source area on the Dyce site.
13 That's followed by the Weiss action complaint in June of 2000.
14 In June of 2000, within two weeks of when that was issued,
15 Soco tendered that to its insurance companies. But between
16 1999 and June of 2000, Soco was putting together its
17 historical insurance program so that it could make a tender.
18 Mr. Nanzig is not in a position to offer any probative
19 testimony whatsoever on the question of, you know, notice or
20 awareness in the '70s, the '80s, and the '90s.

21 THE COURT: No. I assume what he'd be offered for
22 is to prove the prejudice part of it. Is that it?

23 MR. JOHNSON: Correct, Your Honor.

24 MR. BANKER: Well, prejudice between December of
25 1999 and June of 2000 is one thing.

1 THE COURT: Yes, I know. It's a whole lot different
2 when you go back to '75 when you all say this -- or '76 or '77
3 when you all say this occurred.

4 MR. BANKER: And I think, you know, given, given how
5 the Court has bifurcated this case into two phases, if
6 Mr. Nanzig was going to take -- if the Court was inclined to
7 allow Mr. Nanzig to take the stand, we would at least have a
8 concern that his testimony be carefully limited to what is
9 pertinent to this case.

10 THE COURT: Which you say is '99 to 2000 or 2001.

11 MR. BANKER: If you want to talk about between '99
12 and 2000 --

13 THE COURT: Right, and I'm saying I don't know what
14 the answer to that question is. I'm telling you, why I'm
15 having, why I'm having this discussion, to tell you what I'm
16 bothered by.

17 MR. CRANE: Your Honor, could I make a couple of
18 observations along those lines?

19 THE COURT: You can.

20 MR. CRANE: Thank you.

21 There's a false premise in Mr. Banker's argument.
22 The testimony is very clear from Dyce's own employees,
23 including Mr. Colver and Mr. Naff, that they knew perc was
24 dangerous to the environment, they knew it shouldn't get to
25 the environment, and if it happened the way they argued it

1 happened, they designed a facility to make it get to the
2 environment and damage the environment. So the false premise
3 is that they wouldn't reasonably anticipate damage to the
4 environment. That's what they designed, and that's a jury
5 question.

6 THE COURT: I know. I know, and I'm saying, is that
7 what "reasonably anticipate" means?

8 MR. CRANE: I think it is certainly encompassed
9 within that.

10 And then the second problem, if I could, Your Honor,
11 as to Continental, they've been waving this Continental loss
12 form to the jury with every single witness where Mr. Naff now
13 testifies that he took the Continental people around and said,
14 "There's no loss." Well, we wouldn't have even issued a
15 policy if they had told us there was a loss. So I think that
16 has to go to the jury, too, on prejudice.

17 THE COURT: Well, I don't know the answer. You all
18 be prepared to tell me in the morning --

19 MR. CRANE: Thank you, Your Honor.

20 MR. JOHNSON: Thank you, Your Honor.

21 THE COURT: -- in about five minutes, because I'm
22 inclined to think, because of the facts of this case and the
23 way the testimony has come in, we go all the way back to 1975.

24 However, you have a battery of lawyers, apparently,
25 both sides, and you work. They work during the day so they

1 can feed them to me at night. They can work tonight and feed
2 them to me in the morning.

3 MR. BANKER: They'll be happy to hear that, Your
4 Honor.

5 MR. JOHNSON: Thanks, Your Honor.

6 THE COURT: Yeah, I figured they would be. I have
7 to read them.

8 MR. JOHNSON: Thank you.

9 THE COURT: Thank you.

10 (Proceedings were recessed at 17:20:37.)
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VOLUME 7 REPORTER'S CERTIFICATE

I, JoAnn Corson Bacheller, a Registered Diplomat Reporter and Certified Realtime Reporter, certify that the foregoing transcript is a true and correct record of the proceedings given at the time and place hereinbefore mentioned; that the proceedings were reported by me in machine shorthand and thereafter reduced to typewriting using computer-assisted transcription; that after being reduced to typewriting, a certified copy of this transcript will be filed electronically with the Court.

I further certify that I am not attorney for, nor employed by, nor related to any of the parties or attorneys to this action, nor financially interested in this action.

IN WITNESS WHEREOF, I have set my hand at Billings, Montana this 27th day of April, 2010.

/s/ JoAnn Corson Bacheller

JoAnn Corson Bacheller
United States Court Reporter